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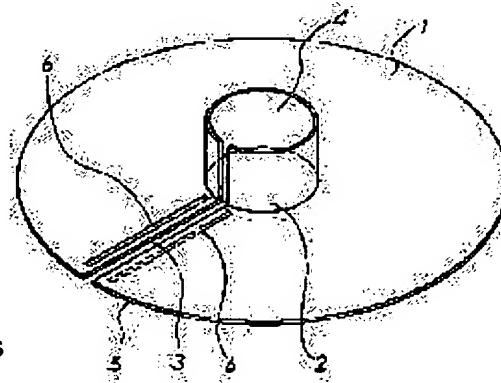
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(54) FILM FOR CULTURING FRUIT TREE

(57)Abstract:

PURPOSE: To obtain the subject film capable of simply executing and improving sugar concentration, etc., of fruits, etc., by providing a cutting part ranging from an opening in the central part of an air permeable waterproof film to the outer edge part.

CONSTITUTION: An opening 2 is formed in the central part of an air permeable waterproof film 1 and a cutting part 3 ranging from the outer edge part 5 to the opening 4 is provided and the trunk of a fruit tree is inserted into the opening of the film 1. After the trunk of the fruit tree is inserted into the opening, the cutting part is preferably joined by a joining member 6 and a cylindrical collar 4 is preferably provided in the opening. The film has preferably 2000-5000 sec/100ml air permeability and \geq 1500mm H₂O water pressure resistance.



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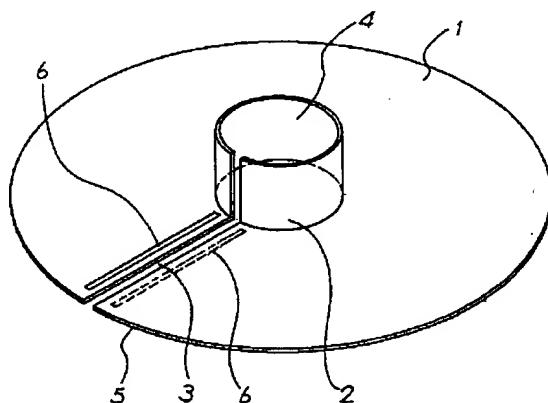
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(54)【発明の名称】 果樹栽培用フィルム

(57) 【要約】

【目的】 本発明は、施工が簡単で効率的な作業が行え、ミカン、リンゴ、ブドウ、スイカ等の木本性又は草本性の果実植物を栽培するに用い、糖度等の品質の向上した果実類が得られる果樹栽培用フィルムを提供する。

【構成】 通気性防水フィルムから構成されており、中央部に開孔が形成されたシート状物であって、該シート状物の外縁部から中央部の開孔まで達する切開部が設けられていることを特徴とする果樹栽培用フィルム。



【特許請求の範囲】

【請求項1】 通気性防水フィルムから構成されており、中央部に開孔が形成されたシート状物であって、該シート状物の外縁部から中央部の開孔まで達する切開部が設けられていることを特徴とする果樹栽培用フィルム。

【請求項2】 開孔の縁から立ち上がる筒状のカラーが設けられていることを特徴とする請求項1に記載の果樹栽培用フィルム。

【請求項3】 切開部の端縁近傍には切開部を接合するための接合部材が設けられていることを特徴とする請求項1に記載の果樹栽培用フィルム。

【請求項4】 通気性防水フィルムがポリオレフィン樹脂(A)100重量部に対し、充填剤(B)100~400重量部、常圧での沸点が200℃以上、かつ融点が100℃以下の炭化水素化合物(C)1~100重量部を含有する樹脂組成物を、フィルム又はシートに成形し、少なくとも一軸方向に延伸倍率1.2~8倍で延伸して得た微多孔性フィルムであることを特徴とする請求項1に記載の果樹栽培用フィルム。

【請求項5】 ポリオレフィン樹脂(A)が密度0.930g/cm³以下、メルトインデックス2g/10分以下のポリオレフィン樹脂である請求項4に記載の果樹栽培用フィルム。

【請求項6】 炭化水素化合物が分子内にエステル結合もしくはアミド結合を有する分子量100以上の炭化水素化合物である請求項4に記載の果樹栽培用フィルム。

【請求項7】 樹脂組成物にラジカル発生剤(D)を0.0001~0.1重量部含有させ、フィルム又はシートに成形するに際し、該ラジカル発生剤が分解する条件とする請求項4に記載の果樹栽培用フィルム。

【請求項8】 通気性防水フィルムとして厚さが15~50μ、透気度が2000~5000秒/100ml、耐水圧が1500mmH₂O以上のフィルムを用いることを特徴とする請求項1に記載の果樹栽培用フィルム。

【請求項9】 通気性防水フィルムが、透湿度が1000~10,000gH₂O/m²・24hr、のフィルムであることを特徴とする請求項1に記載の果樹栽培用フィルム。

【請求項10】 通気性防水フィルムが、厚さが15~50μ、透湿度が1000~10,000gH₂O/m²・24hr、透気度が2000~5000秒/100ml、耐水圧が1500mmH₂O以上のフィルムに、目付けが15~30g/m²のナイロン系、ポリエステル系又はポリエチレン系不織布を接着面積が10~30%で貼り合わされて構成されてなる積層体であることを特徴とする請求項1に記載の果樹栽培用フィルム。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は通気性防水フィルム(本

明細書中フィルムとは厚めのフィルム、即ちシートも含む)を用いて、ミカン、リンゴ、ブドウ、スイカ等の木本性又は草本性の果実植物を栽培するのに用いる果樹栽培用フィルムに関するもので、糖度等の品質の向上した果実類を得ることのできる果樹栽培用フィルムに関する。

【0002】

【従来の技術】 青果物は、収穫の1~2カ月前から収穫時にかけ、降雨等により根から水が供給されると、果実内の水分増加と呼吸量増加を招き、糖度や酸度減少等品質が低下することが知られている。この為、品質向上を目的に、一般には収穫前に地表面を敷わらで覆い、土壤への水分の遮断を行っている。しかし敷わらは吸水量が少い為大きな効果は得られていない。

【0003】 また、地表面をビニールシートで被覆する方法も知られているが、ビニールシートで被覆したままでおくと、通気性が無い為、呼吸により発生する炭酸ガスが地下部に充満し、根が窒息状態となり逆効果を招く懸念がある。従って、晴天の時はシートを除いて裸地化し、雨天の時のみシートで地表面を被覆する作業が必要であるが、これは作業が煩雑でなかなか普及していない。

【0004】 また、最近、防水性及び通気性を有する資材としてポリプロピレン等の超極細合成繊維製の不織布を長繊維不織布で補強した不織布も考えられたが、これをシートとして使用した場合、繊維の間から水が浸みこむのを避けられない。又、水の浸みこみを少くする為シートを厚くする必要があり、材料費が高くなり、しかも重くて取扱いが不便になる欠点があり、広く普及するに至っていない。

【0005】 更に、通気性を有し、防水性能に優れたフィルムも開発され、これを用いて地表面を被覆する事も考えられた。しかし、これらのフィルムは長尺物を巻き取ったものを施工の際巻戻して用いるもので施工に手間が掛り、効率的とは言い難かった。

【0006】

【発明が解決しようとする課題】 本発明は、通気性シートを特定の形状に加工することにより、施工に手間の掛からない果樹栽培用フィルム又はシートを提供することを目的とするものである。

【0007】

【課題を解決するための手段】 本発明の要旨は、通気性防水フィルムから構成されており、中央部に開孔が形成されたシート状物であって、該シート状物の外縁部から中央部の開孔まで達する切開部が設けられていることを特徴とする果樹栽培用フィルムに存する。

【0008】 以下、図面を用いて本発明の果樹栽培用フィルムについて更に説明する。図1は本発明の果樹栽培用フィルムの一例の斜視図である。図中、1は果樹栽培用フィルム、2は開孔、3は切開部、4はカラー、5は

外縁部、6は接合部材をそれぞれ示す。

【0009】果樹栽培用フィルム1は後述するような方法で作られた通気性防水フィルムから構成されている。通気性防水フィルムとは空気、水蒸気等の気体に対して透過性を有し、且つ水滴（液体）に対し非透過性を有するフィルムで、上記性能を有するものであれば広い範囲から選ばれるが、好ましくは透気度2000～5000秒/100mlまたは耐水圧1500mmH₂O以上の性能のフィルムが良い。

【0010】ここで、透気度はJIS-P-8117に規定する方法、透湿度はJIS-Z-0208に規定する方法、また、耐水圧はJIS-L-1092A法により測定される値である。透気度が小さすぎるとガス透過性が悪くガス障害を引きおこし根を傷める原因となる。また耐水圧が小さいと、水滴が浸みこみ土が適度の乾燥状態に保てず品質向上効果が不明確となると同時に防水性を増す為にフィルムを厚くする事が必要となり、フィルムが重く、厚くなるため取扱い性が悪くなり不適となる。

【0011】フィルム厚に関しても特に制限はないが、実用上15mμ～50mμが好ましい。フィルム材質についても特に規定されるものではないが、通常、ポリエチレン、ポリプロピレン等のポリオレフィン系樹脂製フィルムが好適に使用される。

【0012】本発明の果樹栽培用フィルム1の構造は、適宜の大きさ、形状（丸、四角等）の通気性防水フィルムからなるシート状物の中央部に開孔2が形成された構造を有し、該シート状物の外縁部5から中央部の開孔2まで達する切開部3が設けられている。

【0013】使用に当たっては、果樹の根本の地表面にこのシートを被覆して用いるが、切開部3は、果樹の幹を果樹栽培用フィルム1の開孔2まで通すためのものである。果樹の幹を果樹栽培用フィルム1の開孔2まで通した後は、切開部3は開いている必要は無くなるので地面上に鉛で止めたり、ファスナー、粘着テープ等の接合部材6で接合するのが良い。

【0014】シート状物の中央部の開孔2には開孔2の縁から立ち上がる筒状のカラー4が設けられていることが好ましい。カラー4は果樹の幹の根本を完全に被覆るために設けられるのが好ましく、また、果樹の根本の太さの違いに対応するために役立つ。カラー4は紐等で果樹の幹に結び付けて固定されるが、カラー4に予め紐、粘着テープ、ファスナー等の結合具を取り付けておいても良い。

【0015】次に、通気性防水フィルムの製造方法の一例を説明しておく。ポリオレフィン樹脂（A）はエチレンもしくはプロピレンのホモポリマー又はエチレンもしくはプロピレンと他のコモノマー（炭素数4以上の二重結合を分子内に1個以上有する化合物）とのコポリマーからなり、密度（ρ）0.930g/cm³以下、メル

トインデックス（MI）2g/10分以下のポリオレフィン系熱可塑性樹脂が好ましい。

【0016】たとえば低密度ポリエチレン、線状低密度ポリエチレン、エチレン-酢酸ビニル共重合体、密度0.910以下の超低密度ポリエチレン、ポリプロピレン、エチレン-プロピレン共重合体、エチレン-プロピレン-ジエン共重合体、エチレン-メタアクリル酸エステルもしくはこれらの混合物等いずれでも良いが、好ましくは密度0.91～0.95g/cm³の線状低密度ポリエチレン50～100重量部と密度0.91g/cm³未満のエチレン-α-オレフィン共重合体50～0重量部とからなるρ0.930g/cm³以下、MI2以下のポリオレフィン系熱可塑性樹脂である。

【0017】線状低密度ポリエチレンは、エチレンと他のα-オレフィンとの共重合物であり、例えばエチレンと、その4～17重量%程度、好ましくは5～15重量%程度の1-ブテン、1-ヘキセン、1-オクテン、1-デセン、4-メチル-1-ペンテン等の他のα-オレフィンと、中低圧法高密度ポリエチレン製造に用いられるチーグラー型触媒又はフィリップス型触媒を用いて共重合することにより製造される。

【0018】上記エチレン-α-オレフィン共重合体としては、通常、エチレンと炭素数3以上のα-オレフィンとの共重合体であって、その密度が0.91g/cm³未満のものが好ましく、より好ましくは0.85～0.90g/cm³のものである。エチレンと共重合させる炭素数3以上のα-オレフィンとしてはプロピレン、1-ブテン、1-ペンテン、1-ヘキセン、4-メチル-1-ペンテン等が挙げられ、これらと共に1,4-ヘキサジエン、ジシクロペンタジエン、エチリデンノルボルネン等の非共役ジエンを使用することもできる。

【0019】上記エチレン-α-オレフィン共重合体は、チーグラー型触媒、中でもオキシ三塩化バナジウム、四塩化バナジウム等のバナジウム化合物と有機アルミニウム化合物とからなる触媒を用いて、エチレンとα-オレフィンとを共重合させることにより製造することができ、共重合体中のエチレン含有量が40～90モル%の範囲であり、α-オレフィンの含有量が10～60モル%の範囲であるのが望ましい。

【0020】上記エチレン-α-オレフィン共重合体の市販品としては例えば、C d F Chimie E. P. 社のNORSOFLEX (FW1600, FW1900, MW1920, SMW2440, LW2220, LW2500, LW2550)；日本ユニカ社のフレックスレジン (DFDA1137, DFDA1138, DEF D1210, DEF D9042)；三井石油化学社のタフマー (A4085, A4090, P0180, P0480)、日本合成ゴム社のJ S R-E P (E P 02 P, E P 07 P, E P 57 P)などが挙げられる。

【0021】単独もしくは混合物であるポリオレフィン

樹脂(A)の密度(ρ)は 0.930 g/cm^3 より大きいと、可塑剤とラジカル発生剤の相乗効果が小さく引裂強度が向上しない。またMIは 2 g/10分 より大きいと、フィルムの引裂強度が低下し、また成形安定性が低下する。

【0022】本発明方法においてメルトインデックス(MI)とはJIS-K-6760の引用規格であるJIS-K-7210の表1の条件4に準拠して測定した値である。なお、ポリオレフィン樹脂には、常法に従い、熱安定剤、紫外線安定剤、顔料、帯電防止剤、蛍光剤等を添加しても差支えない。

【0023】次に成分(B)の充填剤としては、無機及び有機の充填剤が用いられる。無機充填剤としては、炭酸カルシウム、タルク、クレー、カオリン、シリカ、珪藻土、炭酸マグネシウム、炭酸バリウム、硫酸マグネシウム、硫酸バリウム、硫酸カルシウム、水酸化アルミニウム、酸化亜鉛、水酸化マグネシウム、酸化カルシウム、酸化マグネシウム、酸化チタン、アルミナ、マイカ、アスベスト粉、ガラス粉、シラスパルーン、ゼオライト、珪酸白土等が使用され、特に炭酸カルシウム、タルク、クレー、シリカ、珪藻土、硫酸バリウム等が好適である。

【0024】有機充填剤としては、木粉、パルプ粉等のセルロース系粉末等が使用される。これらは単独で又は混合して用いられる。充填剤の平均粒径としては、 $30\text{ }\mu\text{m}$ 以下のものが好ましく、 $10\text{ }\mu\text{m}$ 以下のものが更に好ましく、 $0.8\sim 5\text{ }\mu\text{m}$ のものが最も好ましい。粒径が大きすぎると延伸物の気孔の緻密性が悪くなり、又粒径が小さすぎると、樹脂への分散性が悪く、成形性も劣る。

【0025】充填剤の表面処理は、樹脂への分散性、更には延伸性の点で、実施されている事が好ましく、脂肪酸又はその金属塩での処理が好ましい結果を与える。成分(C)の炭化水素化合物としては、常圧での沸点が 200°C 以上、かつ融点が 100°C 以下のものが用いられる。例えば、液状またはワックス状の炭化水素重合体や、ジペンタエリスリトールのエステル化物を用いるのが良い。

【0026】液状またはワックス状の炭化水素重合体としては、液状ポリブタジエン、液状ポリブテン、液状ポリイソブレン及びそれらの誘導体が挙げられる。なかでもカルボキシル基あるいは水酸基末端液状ポリブタジエンが用いられ、水酸基末端液状ポリブタジエンの誘導体、例えば末端がイソシアネート変性、無水マレイン酸変性、エポキシ基変性等の液状物も用いられる。

【0027】更には液状ポリブタジエンを水素添加した液状のポリブタジエン水添物、水酸基末端液状ポリブタジエンを水素添加したポリヒドロキシ飽和炭化水素が用いられる。該ポリヒドロキシ飽和炭化水素は、1分子当たり少なくとも1.5個の水酸基を有する主鎖が飽和し

たまたは大部分飽和した炭化水素重合体である。これらの数平均分子量は $400\sim 20,000$ 、さらには $500\sim 10,000$ が好ましい。

【0028】またカルボキシル基末端液状ポリブタジエンの水添物を用いてもよい。エポキシ基含有有機化合物も用いられ、例えばエポキシ化アマニ油、エポキシ化大豆油等のエポキシ化植物油、エポキシ樹脂、好ましくは硬化剤を含まない液状エポキシ樹脂等のエポキシ系可塑剤が挙げられる。更に液状又はワックス状の炭化水素重合体あるいはエポキシ基含有有機化合物は、 $1\sim 100$ 重量部、好ましくは $1\sim 70$ 重量部である。エポキシ基含有有機化合物は、これを単独で用いるより、炭化水素系重合体との併用とする方が好ましい。

【0029】液状またはワックス状の炭化水素重合体又はエポキシ基含有有機化合物を配合する際にはポリオレフィン樹脂 100 重量部に対して 100 重量部を越えるとポリオレフィン樹脂の持つ特性が薄れ満足な混練性、フィルムの成形性および延伸性を確保することが出来ない。第三成分としては、他にジペンタエリスリトールの全又は部分エステル化物等も好適に用いられる。ジペンタエリスリトールのエステル化物は、ジペンタエリスリトールとカルボン酸の部分エステルであるのが好ましい。代表的カルボン酸としては炭素数 $1\sim 30$ の脂肪族モノまたはジカルボン酸および炭素数 $7\sim 16$ の芳香族モノまたはジカルボン酸が挙げられる。成形性、延伸性の点から特に脂肪族モノカルボン酸が好ましい。

【0030】これらの例としては、酢酸、プロピオン酸、酪酸、イソ酪酸、吉草酸、イソ吉草酸、カプロン酸、イソカプロン酸、2-エチルブタン酸、エナント酸、カブリル酸、2-エチルヘキサン酸、ノナン酸、カブリル酸、ラウリン酸、トリデカン酸、ミリスチン酸、ペンタデカン酸、パルミチン酸、ステアリン酸、エイコサン酸、ペヘン酸、セロチン酸、メリシン酸、コハク酸、グルタル酸、アジピン酸、アゼライン酸、セバシン酸等の脂肪族カルボン酸、安息香酸、フタル酸、イソフタル酸、テレフタル酸等の芳香族カルボン酸が挙げられる。ジペンタエリスリトールの単分子部分エステルの場合は上記モノカルボン酸を単独又は混合して使用できる。また、ジカルボン酸を使用する場合はジペンタエリスリトール1モルに対し 0.5 モル以下が好ましく、残った水酸基は相当するモル数のモノカルボン酸を使用して部分エステルとする。

【0031】また、該ジペンタエリスリトールの部分エステル1分子当たりの残存OH基数の割合としては 3% から 70% の間がよく、 $3\sim 50\%$ の間が特に好ましい。 3% 未満では延伸性及び印刷性の改良効果が不十分であり、 70% を越えるとフィルムの製膜性が低下する。ジペンタエリスリトールのエステル化物の配合割合は、ポリオレフィン系樹脂 100 重量部に対し、 $1\sim 30$ 重量部が好ましく、 $3\sim 20$ 重量部が更に好ましい。

【0032】配合量が多すぎると満足すべき混練性が得られず、フィルムの成形性、延伸性を確保できない。特に、分子内にエステル結合もしくはアミド結合を有する分子量100以上、かつ常圧での沸点が200℃以上かつ融点が100℃以下の化合物である。例えば、オレイン酸アミド、ステアリン酸アミド、ジオクチルフタレート、トリオクチルトリメリテート等が好ましい。

【0033】より好ましくは、分子量350以上、かつ常圧での沸点が250℃以上、融点が50℃以下で炭素数6以上のカルボン酸と炭素数5以上のアルコールとかなるエステル化合物、更に好ましくは、分子量350以上、かつ常圧での沸点が250℃以上、融点が30℃以下で、芳香族カルボン酸と炭素数6以上のアルコールとかなるエステル化合物、例えば、DOP、トリオクチルトリメリテート、DIDP等である。

【0034】融点は100℃より高いとラジカル発生剤での変性による引裂強度向上の効果が少なく、また沸点が200℃未満では、成形加工時の発煙、発泡により成形・延伸性が低下する。また分子量が小さいと、フィルムから可塑剤のブリーディングが早く好ましくない。

【0035】次に、必要に応じ本発明に使用される成分(D)のラジカル発生剤としては、半減期1分となる分解温度が130～300℃の範囲のものが好ましく、例えばジクミルペルオキシド、2,5-ジメチル-2,5-ジ(t-ブチルペルオキシ)ヘキサン、2,5-ジメチル-2,5-ビス(t-ブチルペルオキシ) -3-ヘキシン、α, α'-ビス(t-ブチルペルオキシソブロビル)ベンゼン、ジベンゾイルペルオキシド、ジ- t-ブチルペルオキシド等の過酸化物が挙げられる。

【0036】本発明においては、ポリオレフィン樹脂(A)100重量部に対して充填剤(B)100～400重量部、炭化水素化合物(C)1～100重量部、及び必要に応じラジカル発生剤(D)0.0001～0.1重量部の範囲で用いる。充填剤(B)の割合が100重量部に満たないと、延伸したフィルムに気孔が充分形成されず、多孔化度合が低くなる。また、充填剤の割合が400重量部を超えると混練性、分散性、フィルム又はシート成形性が劣り、更に延伸物の表面強度が低下する。

【0037】本発明において、特に好ましい配合割合は、ポリオレフィン樹脂(A)100重量部に対して充填剤(B)120～300重量部である。炭化水素化合物(C)は1重量部よりも少ないと、引裂強度向上の効果が無く、100重量部より多いと、混練性、分散性が悪化し、フィルム成形性の低下、延伸性を確保できない。好ましくは5重量部以上50重量部以下である。

【0038】ラジカル発生剤(D)は0.0001～0.1重量部の範囲から選ばれ、この範囲よりも少ないと場合は炭化水素化合物との相乗効果による引裂強度の向上は得られず、またこの範囲よりも多い場合はメルトイ

ンデックスが低くなり過ぎて、フィルム成形時に膜切れが起りやすく、かつフィルム表面に肌荒れが生起するので好ましくない。

【0039】本発明においては、ポリオレフィン樹脂(A)、充填剤(B)、可塑剤(C)、及びラジカル発生剤(D)を、通常は、例えば次のI又はIIの方法により前記の量比で混合し、次いで混練してペレット化した後、Tダイ成形やインフレーション成形して未延伸フィルムとする。

方法I：ポリオレフィン樹脂、充填剤、可塑剤及び、ラジカル発生剤を混合し、押出機、バンパリーミキサー等の混練機を用いて混練した後、ペレット化し、このペレットを用いてTダイ成形やインフレーション成形する。

方法II：ポリオレフィン樹脂に、多量のラジカル発生剤0.5～1% (5000～10000 ppm程度)を配合し、ラジカル発生剤がポリオレフィンと殆ど反応しない温度で、しかもポリオレフィンの融点以上の温度において溶融混練してペレット状としたマスター・バッチを予め調製し、このマスター・バッチを、ポリオレフィン樹脂、充填剤及び可塑剤と混合し、混練した後ペレット化し、このペレットを用いてTダイ成形やインフレーション成形する。

【0040】上記I又はIIに示す方法に従って、ポリオレフィン樹脂をラジカル発生剤と共に加熱下(好ましくはラジカル発生剤の半減期が10分となる温度以上の温度で)混練処理すると、ラジカル発生剤による架橋反応が生じポリオレフィンが分子間カップリングして高分子量成分が増加し、かつメルトイ・インデックスの低下した変性ポリマーが得られる。この変性ポリマーは、変性前のポリマーに比べてインフレーション成形を用いた場合には横方向の配向がかり易く、このようにして得られたフィルムは、これを延伸処理した場合に、引張り強度及び衝撃強度が著しく向上する。

【0041】ポリオレフィン樹脂、可塑剤、ラジカル発生剤及び充填剤を混合するには、ドラム、タンブラー型混合機、リボンブレンダー、ヘンシェルミキサー、スーパーミキサー等が使用されるが、ヘンシェルミキサーのような高速攪拌型の混合機が望ましく、ポリエチレンは通常10～150メッシュ、特に20～60メッシュのパウダーの形態で供給するのが好ましい。得られた混合物の混練は、例えばスクリュー押出機、二軸スクリュー押出機、ミキシングロール、バンパリーミキサー、二軸型混練機等の周知の混練装置を用いて実施される。

【0042】本発明においては、上記で得た混合物からTダイ法またはインフレーション法により未延伸フィルムを成形し、次いでこの未延伸フィルムを延伸処理する。インフレーション成形の場合は、ブローアップ比(BUR)を2～8で成形する。好ましくは、ブローアップ比3～6、フロストラインの高さをダイの環状スリットの直径の2～50倍にする。さらに好ましくはフロ

ストラインの高さをダイの環状スリットの直径の5～20倍の範囲の条件下で行なわれる。プローアップ比が上記範囲よりも低いとフィルムの引張り強度及び衝撃強度が低下し、上記範囲よりも高いとバブルの成形安定性が低下するので好ましくない。また、フロストラインの高さが上記範囲よりも低いとフィルムの引張り強度が低下し、上記範囲よりも高いとバブルの成形安定性が低下するので好ましくない。

【0043】Tダイ法またはインフレーション法により成形された未延伸フィルムは、次いで少なくとも一軸方向、好ましくは縦方向（フィルムの引き取り方向）に一軸延伸される。一軸延伸には通常ロール延伸法が採用されるが、チューブラー延伸法で一軸方向（引き取り方向）を強調させた形であってもよい。また、延伸処理は一段でも二段以上の多段でも差支えない。

【0044】延伸処理は樹脂組成物の融点より100℃低い温度から融点より20℃低い温度の範囲、特に樹脂組成物の融点より90℃低い温度から融点より50℃低い温度の範囲で実施するのが好ましく、この範囲より低い温度ではフィルムに延伸斑が発生し、またこの範囲より高い温度ではフィルムの多孔性が低下する傾向がある。

【0045】延伸倍率は1.2～8倍であることが必要であり、この範囲未満では延伸フィルムの多孔化及び引張り強度が不充分である。また延伸倍率が8倍を超えると、フィルムは縦方向への過度の分子配向を有するものとなり、フィルムの面強度が低下して好ましくない。なお、一軸延伸後に熱処理すればフィルムの寸法精度を安定化することができ、また公知のコロナ処理、フレーム処理等の表面処理を施すこともできる。

【0046】上述の方法によって得られた柔軟性に富む多孔質フィルムに不織布を貼り合せてもよい。不織布はナイロン（例えばナイロン6、ナイロン66、ナイロン12等）又はポリエステル（例えばポリエチレンテレフタレート、ポリブチレンテレフタレート等）又はポリエチレンからなり、目付が1.5～3.0g/m²のものが好適に使用される。不織布にアルミニウム等を蒸着し、光反射能を持たせた不織布を用いることも可能である。

【0047】ポリエチレン系不織布としては芯材としてポリエステル樹脂を用いポリエチレンで被覆した構造の繊維を用いたものが良い。このような多孔質フィルムと不織布とは以下のような接着構造で貼り合される。すなわち、例えば、ウレタン系2液タイプの接着剤を塗布面積（接着面積）10%～30%で点状に塗布して接着する方法が挙げられる。接着剤の点部分は318万個/m²～1000万個/m²程度で、その点の径は0.1～0.5mm程度とするのが良い。このような接着剤の点状塗布は例えばグラビアロールを用いた転写法等で行なえば良い。

【0048】ポリエチレン系不織布の場合、多孔質フィ

ルムと熱接着するのが良い。接着面積は上記と同程度とするのが良い、空隙の多い不織布を用い不織布の全面で溶着しても、多孔質フィルムの接着部分の割合が上記範囲にあれば良い。熱接着面積が広すぎると多孔質フィルムの開孔が潰れてしまうので注意を要する。上述した構成の積層体によると、多孔質フィルムと不織布とを貼り合せている接着部が極めて微細であることや、また多孔質フィルムの厚さなどを要因として多孔質フィルムの表面が非常に平滑となり、その結果当該表面への印刷も極めて鮮明にでき、しかも全体として風合は著しく向上し且つ通気性を損なうことはない。

【0049】上述した積層体の不織布はスパンボンド不織布やニードルパンチ不織布等、種々の製法による不織布で良い。また、両者の接着について、接着剤の塗布法としてグラビアロールによる転写性を例示したが、噴霧法などを用いることができる。但し、この場合用いられる接着剤は例えばEVA系接着剤、ゴム系接着剤又はアクリル系接着剤などを用いることが好ましい。

【0050】かかる多孔質フィルムや積層体からなる果実栽培用フィルムを収穫前1～2カ月から収穫にかけて果実植物の根本周辺、該植物の根部上面の地表面に被覆することで本発明の目的である青果物の品質向上が達せられる。被覆方法は、前述したように、切開部3を通して開校2に果樹の幹を位置させる事により簡単に実行される。この果実栽培用フィルム1の大きさが足りない場合には、他に用意した多孔質フィルムや積層体をつなげたり、間に敷きつめたりすれば良い。品質向上効果は青果物の種類によっても異なるが具体的には糖度上昇、裂果防止、色つや向上等である。被覆する方法は特に制限はなく、根の張っている地表面に、シートの間から水滴が入らない様に均一に被覆する方法が好ましい。本発明方法が適用される青果物の種類は特に制限はないが、例えばミカン、ハッサク等のカンキツ類、リンゴ、ナシ、モモ、ブドウ、メロン、スイカ等が挙げられる。

【0051】

【実施例】以下、実施例により本発明を具体的に説明するが、本発明はその要旨を超えない限り、以下の実施例に制約されるものではない。

実施例1、比較例1、2

（1）線状低密度ポリエチレン {メルトインデックス (MI) : 1.0g/10分、流動比: 1.9、密度: 0.921g/cm³、共重合成分: 1-ブテン、共重合量: 10重量%、融点: 120℃} を40メッシュのパウダーに粉碎したものを80重量部とエチレン-プロピレン共重合体 (EPR、日本合成ゴム社製EPR7P) を同じく40メッシュのパウダーに粉碎したものを20重量部とをヘンシェルミキサー中で攪拌混合し、次いでこれに可塑剤としてジオクチルフタレート4重量部とラジカル発生剤2、5-ジメチル-2、5-ビス(1-ブチルペルオキシ) -3-ヘキシンを0.03重量部

搅拌しながら添加混合する。

【0052】更に炭酸カルシウム（平均粒径1.2μm、脂肪酸処理）を200重量部添加し、搅拌混合した。かくして得られた混合物を、二軸混練機DSM-65 (Double Screw Mixer, 日本製鋼所(株)製) を用いて混練し、造粒した。これを40mmφ押出機によりインフレーション成形し、厚さ70μmのフィルムに製膜した。押出条件は下記のとおり。

【0053】

【表1】

シリンダー温度：170-190-210-230°C

ヘッド、ダイス温度：200°C

ダイス直径：100mm

引取速度：8m/min

プローアップ比：3

フロストライン高さ：700mm

折り径：471mm

かくして得られたフィルムを引取方向にスリットしたものをロール延伸機により一軸延伸を行った。

【0054】延伸条件は下記のとおりとした。

【表2】

延伸温度：60°C

延伸速度：11.0m/min

延伸後のフィルム厚み：30μm

【0055】得られたフィルムの物性評価は下記のとおり。

【表3】

透気度 1800秒/100ml

透湿度 3800g/m²/24Hr

耐水圧 >2000mm H₂O

引裂強度 60g/1枚

成形性 ◎

柔軟性 ◎

延伸性 ◎

【0056】物性評価は下記によって行なった。

- 1) 透湿度：ASTM E 26-66 (E) に準する。
- 2) 引裂強度：JIS P 8116に準じ、フィルムの引取方向を測定し、1枚当りの強度をgで求める。
- 3) 成形性：目視により次の基準により判定した。

◎：バブル安定、ダイライン無し

○："、ダイライン有

△：フィルム幅変動

×：成形不可

【0057】

4) 柔軟性：手の感触で、次の基準により判定した。

◎：極めて柔らかい

○：柔らかい

△：少し硬い

×：硬い

【0058】5) 延伸性

◎：切断なし、均一延伸、延伸ムラなし

○：切断なし、延伸ムラ、殆どなし

△：切断なし、延伸ムラ、ややあり

×：切断又は延伸ムラ大

【0059】上記のポリエチレン製の多孔質フィルムを図1に示すような外径5mの円形フィルムの中央部に径30cmの開孔と、高さ30cmのカラーを形成した果実栽培用フィルムに加工し、温州早生ミカン（興津早生、樹令10年生）の根本に被覆した。果実栽培用フィルムの周囲及び切開部を紙により地面に固定し、カラーは幹に紐で固定した。

【0060】被覆は92年11月21日、収穫は'93年1月7日で被覆時の糖度は12.4%、酸度は1.24%、糖酸比10.0~10.1、果汁93.4~93.5%、果径（横）57.5~58.0mm、果径（縦）44.5~44.7mm、表面外観良好であった。収穫時の品質（糖度、酸度、果汁、果径、表面外観）は表1に示す通りである。

【0061】尚、比較例として果実栽培用フィルムを施さない栽培（比較例2）における品質も表1に示した。表1に示すように本発明方法によれば、糖度13.3%、酸度0.94%、糖酸比14.1%、果汁93%、表面外観、色ツヤも良く第一級品の果実が得られた。

【0062】これに対して、対照区（果実栽培用フィルムを施さなかった地区）は果汁が78.5%と果汁が減少し、みづみづしさに欠けた。

【0063】

【表4】

表1

	実施例1	比較例1	比較例2
糖 度 (%)	13.3	13.1	11.5
酸 度 (%)	0.94	0.95	0.96
糖 酸 比	14.1	13.8	13.5
果 汁 (%)	93.0	91.0	78.5
果径ヨコ (mm)	57.5	56.2	54.5
タテ (mm)	44.3	43.5	41.3
表 面 外 観 (含着色度合)	○良 良	○良 良	△ やや不良

【0064】実施例2

実施例1で得られた多孔質フィルムに目付が25g/m²のポリエチレンスパンボンド不織布を熱融着して積層体とした。得られた積層体の通気度は1500秒/100ml、透湿度は3500g/m²/24hrであった。この積層体を用い実施例1と同様にして温州早生ミカンの根本を被覆したところ、実施例1とほぼ同様の結果が得られた。

【0065】実施例3

実施例1においてラジカル発生剤を添加しなかったほかは実施例1と同様にして多孔質フィルムを得た。押出時の成形性が若干不安定であったが多孔性フィルムは得られた。

【0066】フィルムの物性評価は下記のとおり。

【表5】

透気度	2000秒/100ml
透湿度	4000g/m ² /24hr
耐水性	>1800mmH ₂ O
引裂強度	40g/1枚
成形性	○
柔軟性	○
延伸性	△

得られたフィルムを用い実施例1と同様にして温州早生ミカンの根本を被覆したところ、実施例1とほぼ同様の結果が得られた。

【0067】実施例4

実施例3で得られた多孔質フィルムに目付が20g/m³のナイロンスパンボンド不織布を接着剤(不織布側に塗布)を用いて積層した。得られた積層体の通気度は1800秒/100ml、透湿度は3800g/m²/24hrであった。この積層体を用い実施例1と同様にして温州早生ミカンの根本を被覆したところ、実施例1とほぼ同様の結果が得られた。

【0068】

【発明の効果】本発明の果実栽培用フィルムは施工が簡単で効率的な作業が行え、簡単な作業で酸度低下、糖度上昇にみられる様な品質の向上した果実が得られる。また、フィルム強度が強いので薄いフィルムとすることが可能となり、作業性が向上すると共にフィルムの製造コストも安くすることができる。

【0069】

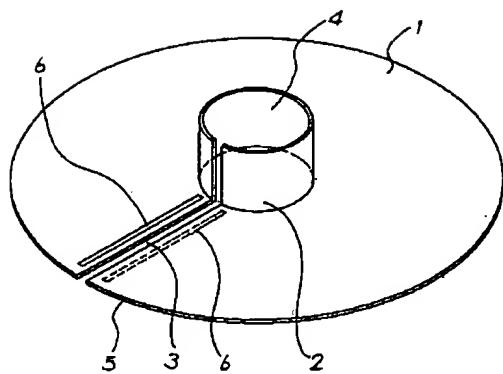
【図面の簡単な説明】

【図1】 本発明の果樹栽培用フィルムの一例の斜視図。

【符号の説明】

- 1 果樹栽培用フィルム
- 2 開孔
- 3 切開部
- 4 カラー
- 5 外縁部
- 6 接合部材

【図1】



* NOTICES *

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damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The film for fruit growing characterized by preparing the incision section which is the sheet-like object with which it consists of porous-waterproofing films, and puncturing was formed in the center section, and is attained from the rim section of this sheet-like object to puncturing of a center section.

[Claim 2] The film for fruit growing according to claim 1 characterized by preparing the tubed color which starts from the edge of puncturing.

[Claim 3] The film for fruit growing according to claim 1 characterized by preparing the joint material for joining the incision section near the edge of the incision section.

[Claim 4] A porous-waterproofing film receives the polyolefin resin (A) 100 weight section. The boiling point in a bulking agent (B) 100 - the 400 weight sections, and ordinary pressure 200 degrees C or more, And the film for fruit growing according to claim 1 which fabricates the resin constituent with which the melting point contains the hydrocarbon compound (C) 1 100 degrees C or less - the 100 weight sections on a film or a sheet, and is characterized by being the fine porosity film which extended by 1.2 to 8 times as many draw magnification as this to at least 1 shaft orientations, and was obtained.

[Claim 5] Polyolefin resin (A) is consistency 0.930 g/cm3. Film for fruit growing according to claim 4 which are [the following and] melt index 2g / polyolefin resin for 10 or less minutes.

[Claim 6] The film for fruit growing according to claim 4 whose hydrocarbon compound is a with a molecular weight of 100 or more which has an ester bond or amide association in intramolecular hydrocarbon compound.

[Claim 7] The film for fruit growing according to claim 4 made into the conditions which it faces making a resin constituent carry out 0.0001-0.1 weight section content of the radical generating agent (D), and fabricating on a film or a sheet, and this radical generating agent decomposes.

[Claim 8] The film for fruit growing according to claim 1 with which 15-50micro, and air permeability are characterized by 2000 - 5000 seconds / 100ml, and water pressure-proof using the film more than 1500mmH(s)2 O by thickness as a porous-waterproofing film.

[Claim 9] The film for fruit growing according to claim 1 with which a porous-waterproofing film is characterized by moisture vapor transmission being the film of 1000 - 10,000gH2 O/m2 and 24hr**.

[Claim 10] 15-50micro, and moisture vapor transmission 1000-10,000gH2 O/m2 and 24hr, [a porous-waterproofing film] [thickness] 2000 - 5000 seconds / 100ml, and water pressure-proof on the film more than 1500mmH(s)2 O [air permeability] A superintendent officer is 15-30g/m2. Film for fruit growing according to claim 1 characterized by being the layered product

which adhesion area sticks a nylon system, a polyester system, or a polyethylene system nonwoven fabric at 10 - 30%, and it puts together and comes to constitute.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the film for fruit growing which can obtain the fruits whose quality, such as a sugar content, improved about the film for fruit growing used for growing arbor nature or herbaceous fruits vegetation, such as a mandarin orange, an apple, a grape, and a watermelon, using a porous-waterproofing film (a film with the thicker film in this description, i.e., a sheet, is included).

[0002]

[Description of the Prior Art] If garden stuff is applied from one - two months before harvest at the time of harvest and water is originally supplied by the rainfall etc., the increment in moisture and the increment in respiration rate in fruits are caused, and it is known that quality, such as a sugar content and acidity reduction, will deteriorate. For this reason, generally, the moisture to a bonnet and soil is intercepted for earth surface by litter before harvest for the purpose of upgrading. However, since litter has few coefficients of water absorption, big effectiveness is not acquired.

[0003] Moreover, although how to cover earth surface with plastic sheeting is also learned, when it sets covered with plastic sheeting, in order that there may be no permeability, the root is filled with the carbon dioxide gas which occurs by breathing, a root will be in an asphyxiation condition and there is **** which causes the opposite effect. Therefore, although the activity it denudes except for a sheet and earth surface is covered with a sheet only in case of [whose] rainy weather is required at the time of fine weather, this has a complicated activity and has not spread easily.

[0004] Moreover, although the nonwoven fabric which reinforced nonwoven fabrics of overly the product made from a super-thin synthetic fiber, such as polypropylene, with the continuous glass fiber nonwoven fabric as materials which have waterproofness and permeability was also considered recently, when this is used as a sheet, it cannot avoid that water permeates and is full from between fiber. Moreover, there is a fault from which it is necessary to thicken a sheet in order for water to permeate and to lessen ****, a material cost becomes high, it is heavy and handling moreover becomes disadvantage, and it has come to spread widely.

[0005] Furthermore, it has permeability, the film excellent in the water proof engine performance was also developed, and covering earth surface using this was also considered. However, what rolled round the long object is rewound in the case of construction, and these films use it, and require time and effort for construction, and it was hard to say that it is efficient.

[0006]

[Problem(s) to be Solved by the Invention] This invention aims at offering the film for fruit growing or sheet which time and effort does not require for construction by processing a permeability sheet into a specific configuration.

[0007]

[Means for Solving the Problem] The summary of this invention consists of porous-

waterproofing films, and consists in the film for fruit growing characterized by preparing the incision section which is the sheet-like object with which puncturing was formed in the center section, and is attained from the rim section of this sheet-like object to puncturing of a center section.

[0008] Hereafter, the film for fruit growing of this invention is further explained using a drawing. Drawing 1 is the perspective view of an example of the film for fruit growing of this invention. the inside of drawing, and 1 -- in the incision section and 4, a color and 5 show the rim section and, as for the film for fruit growing, and 2, 6 shows [puncturing and 3] joint material, respectively.

[0009] The film 1 for fruit growing consists of porous-waterproofing films made by approach which is mentioned later. Although a porous-waterproofing film is a film which has permeability to gases, such as air and a steam, and has nontransparent nature to waterdrop (liquid), and it will be chosen out of the large range if it has the above-mentioned engine performance, the film of the engine performance more than air permeability 2000 - 5000 seconds /, 100ml, or water pressure-proof 1500mmH₂O is preferably good.

[0010] Here, the approach of specifying air permeability to JIS-P -8117, the method of specifying moisture vapor transmission to JIS-Z-0208, and water pressure-proof are values measured by JIS-L-1092A law. If air permeability is too small, gas permeability will become the cause which causes gas injury bad and hurts its root. Moreover, since it rises while soil cannot maintain at moderate dryness by permeating and crowding waterdrop if water pressure-proof is small but the upgrading effectiveness becomes indefinite, it is necessary to thicken a film, and a film is heavy, and since it becomes thick, handling nature worsens and it becomes unsuitable.

[0011] Although there is especially no limit also about film thickness, 15mmmicro-50mmmicro is desirable practically. Although especially film construction material is not specified, either, films made of polyolefine system resin, such as polyethylene and polypropylene, are usually used suitably.

[0012] The incision section 3 which has the structure where puncturing 2 was formed in the center section of the sheet-like object with which it consists of a porous-waterproofing film of magnitude with the proper structure of the film 1 for fruit growing of this invention and configurations (a round head, rectangular head, etc.), and attains it from the rim section 5 of this sheet-like object to the puncturing 2 of a center section is formed.

[0013] Although this sheet is covered and used for the earth surface of the origin of a fruit tree in an activity, the incision section 3 is for letting the trunk of a fruit tree pass to the puncturing 2 of the film 1 for fruit growing. After letting the trunk of a fruit tree pass to the puncturing 2 of the film 1 for fruit growing, since the need of being open is lost, the incision section 3 is good [the need] for a ground surface to stop with a rivet or to join by the joint material 6, such as a fastener and adhesive tape.

[0014] It is desirable that the tubed color 4 which starts from the edge of puncturing 2 is formed in the puncturing 2 of the center section of the sheet-like object. As for a color 4, it is desirable to be prepared in order to cover the origin of the trunk of a fruit tree thoroughly, and also in order to correspond to the difference in the size of the origin of a fruit tree, it is useful. Although a color 4 is tied up and fixed to the trunk of a fruit tree with a string etc., joint implements, such as a string, adhesive tape, and a fastener, may be beforehand attached in a color 4.

[0015] Next, an example of the manufacture approach of a porous-waterproofing film is explained. Polyolefin resin (A) consists of a copolymer of the homopolymer of ethylene or a propylene, ethylene or a propylene, and other comonomers (compound which has one or more

with a carbon numbers of four or more double bonds in intramolecular), and is 3 the consistency (rho) of 0.930g/cm. The following, (melt index MI) 2g / polyolefine system thermoplastics for 10 or less minutes is desirable.

[0016] for example, low density polyethylene and a line -- low density polyethylene and an ethylene-vinylacetate copolymer -- With a consistency of 0.910 or less super-low density polyethylene, polypropylene, ethylene propylene rubber, Although any are sufficient as ethylene-propylene-diene copolymer and ethylene-methacrylic acid ester or such mixture desirable -- consistency 0.91-0.95 g/cm³ a line -- the low-density-polyethylene 50-100 weight section and consistency 0.91 g/cm³ rho 0.930 g/cm³ which consists of the ethylene-alpha olefin copolymer 50-0 weight section of the following Hereafter It is two or less MI polyolefine system thermoplastics.

[0017] a line -- low density polyethylene is the copolymerization object of ethylene and other alpha olefins, for example, is manufactured by copolymerizing ethylene, and the about 4 - 17 % of the weight and other desirable alpha olefins, such as about 5 - 15% of the weight of 1-butene, 1-hexene, 1-octene, 1-decene, and 4-methyl-1-pentene, using the Ziegler type catalyst or the Philips mold catalyst used for inside low voltage method high-density-polyethylene manufacture.

[0018] As the above-mentioned ethylene-alpha olefin copolymer, it is the copolymer of ethylene and a with a carbon numbers of three or more alpha olefin, and the consistency is usually 3 0.91g/cm. The thing of the following is desirable and it is 0.85 - 0.90 g/cm³ more preferably. It is a thing. As a with a carbon numbers of three or more which carry out copolymerization to ethylene alpha olefin, a propylene, 1-butene, 1-pentene, 1-hexene, 4-methyl-1-pentene, etc. are mentioned, and nonconjugated diene, such as 1, 4-hexadiene, a dicyclopentadiene, and ethyldene norbornene, can also be used with these.

[0019] As for the above-mentioned ethylene-alpha olefin copolymer, it is desirable to be able to manufacture by carrying out copolymerization of ethylene and the alpha olefin using a Ziegler - type catalyst and the catalyst which consists of a vanadium compound and organoaluminium compounds, such as vanadium trichloride oxide and a vanadium tetrachloride, especially, for the ethylene content in a copolymer to be 40-90-mol the range in which it is %, and for the content of an alpha olefin to be 10-60-mol the range in which it is %.

[0020] As a commercial item of the above-mentioned ethylene-alpha olefin copolymer, for example CdF Chimie E. NORSOFLEX of P. company FREX resin of; Nippon Unicar (DFDA1137, DFDA1138, DEF D1210, DEF D9042); TAFUMA of a Mitsui petrochemical company (FW1600, FW1900, MW1920, SMW2440, LW2220, LW2500, LW2550) JSR-EP (EP02P, EP07P, EP57P) of (A4085, A4090, P0180, P0480), and Japan Synthetic Rubber Co., Ltd. etc. is mentioned.

[0021] Independent or the consistency (rho) of polyolefin resin (A) which is mixture is 0.930 g/cm³. If large, the synergistic effect of a plasticizer and a radical generating agent will be small, and tearing strength will not improve. Moreover, if MI is larger than 2g / 10 minutes, the tearing strength of a film will fall and shaping stability will fall.

[0022] In this invention approach, a melt index (MI) is the value measured based on the conditions 4 of the table 1 of JIS-K -7210 which is the reference standard of JIS-K -6760. In addition, according to a conventional method, even if it adds a thermostabilizer, UV stabilizer, a pigment, an antistatic agent, a fluorescence agent, etc., it does not interfere with polyolefin resin.

[0023] Next, an inorganic and organic bulking agent is used as a bulking agent of a component (B). As an inorganic bulking agent, a calcium carbonate, talc, clay, a kaolin, a silica, diatomaceous earth, a magnesium carbonate, a barium carbonate, magnesium sulfate, a barium

sulfate, a calcium sulfate, an aluminum hydroxide, a zinc oxide, a magnesium hydroxide, a calcium oxide, magnesium oxide, titanium oxide, an alumina, a mica, asbestos powder, glass powder, milt balun, a zeolite, a clay silicate, etc. are used, and a calcium carbonate, talc, clay, a silica, diatomaceous earth, a barium sulfate, etc. are especially suitable.

[0024] As an organic bulking agent, cellulose type powder, such as wood flour and pulp powder, etc. is used. These are independent, or are mixed and used. As mean particle diameter of a bulking agent, a thing 30 micrometers or less is desirable, a thing 10 micrometers or less is still more desirable, and what is 0.8-5 micrometers is the most desirable. When the compactness of the pore of a drawing object will worsen if particle size is too large, and particle size is too small, the dispersibility to resin is bad and a moldability is also inferior in it.

[0025] The surface treatment of a bulking agent is the dispersibility to resin, and a further ductile point, it is desirable to carry out, and a result with desirable processing with a fatty acid or its metal salt is given. As a hydrocarbon compound of a component (C), 200 degrees C or more are used for the boiling point in ordinary pressure, and a thing 100 degrees C or less is used for the melting point. For example, it is good liquefied or to use a wax-like hydrocarbon polymer and the esterification object of dipentaerythritol.

[0026] As a hydrocarbon polymer of the shape of liquefied or a wax, liquid polybutadiene, liquefied polybutene, liquefied polyisoprenes, and those derivatives are mentioned. Especially, a carboxyl group or hydroxyl-group end liquid polybutadiene is used, and liquefied objects, such as isocyanate denaturation, maleic-anhydride denaturation, and epoxy group denaturation, are also used for the derivative of hydroxyl-group end liquid polybutadiene, for example, an end.

[0027] Furthermore, the polyhydroxy saturated hydrocarbon which hydrogenated the liquefied polybutadiene water garnish which hydrogenated liquid polybutadiene, and hydroxyl-group end liquid polybutadiene is used. This polyhydroxy saturated hydrocarbon is the mostly saturated hydrocarbon polymer, or the principal chain which has 1.5 hydroxyl groups was saturated, even if few per molecule. As for such number average molecular weight, to 400-20,000, and a pan, 500-10,000 are desirable.

[0028] Moreover, the water garnish of carboxyl group end liquid polybutadiene may be used. An epoxy group content organic compound is also used, for example, epoxy system plasticizers, such as epoxidized vegetable oil, such as epoxidation linseed oil and epoxidized soybean oil, an epoxy resin, and a liquefied epoxy resin that does not contain a curing agent preferably, are mentioned. furthermore, the hydrocarbon polymer or epoxy group content organic compound of the shape of liquefied or a wax -- the 1 - 100 weight section -- it is 1 - 70 weight section preferably. It is more desirable to consider an epoxy group content organic compound as concomitant use with a hydrocarbon system polymer rather than it uses this independently.

[0029] If the 100 weight sections are exceeded to the polyolefin resin 100 weight section in case wax-like a hydrocarbon polymer or an epoxy group content organic compound is blended, liquefied or the property which polyolefin resin has fades, and satisfactory kneading nature, the moldability of a film, and ductility cannot be secured. As the third component, ** or a partial esterification object of dipentaerythritol etc. is suitably used for others. As for the esterification object of dipentaerythritol, it is desirable that they are dipentaerythritol and partial ester of a carboxylic acid. As a typical carboxylic acid, the aromatic series monochrome or dicarboxylic acid of the aliphatic series monochrome of carbon numbers 1-30 or dicarboxylic acid, and carbon numbers 7-16 is mentioned. Aliphatic series monocarboxylic acid is desirable especially from a moldability and a ductile point.

[0030] As these examples, aromatic carboxylic acid, such as aliphatic carboxylic acid, such as an
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acetic acid, a propionic acid, butanoic acid, an isobutyric acid, a valeric acid, an isovaleric acid, a caproic acid, isocaproic acid, 2-ethyl butanoic acid, enanthic acid, a caprylic acid, 2-ethyl hexanoic acid, nonoic acid, a capric acid, a lauric acid, a tridecane acid, a myristic acid, a pentadecane acid, a palmitic acid, stearin acid, eicosanoic acid, a PEHEN acid, a cerotic acid a melissic acid, a succinic acid, a glutaric acid an adipic acid, an azelaic acid, and a sebacic acid, a benzoic acid, a phthalic acid, isophthalic acid, a terephthalic acid, be mentioned independent in the above-mentioned monocarboxylic acid in the case of the single molecule partial ester of dipentaerythritol -- or it can be mixed and used. Moreover, when using dicarboxylic acid, to one mol of dipentaerythritol, 0.5 mols or less are desirable and make the remaining hydroxyl group partial ester using the monocarboxylic acid of the corresponding number of mols.

[0031] Moreover, as a rate of the number of residual OH radicals per partial ester 1 molecule of this dipentaerythritol, for 3 to 70% is good, and especially for 3 - 50% is desirable. If less than 3% of the amelioration effectiveness of ductility and printing nature is insufficient and 70% is exceeded, the film production nature of a film will fall. The blending ratio of coal of the esterification object of dipentaerythritol has desirable 1 - 30 weight section to the polyolefine system resin 100 weight section, and its 3 - 20 weight section is still more desirable.

[0032] The kneading nature which should be satisfied if there are too many loadings is not obtained, and the moldability of a film and ductility cannot be secured. The boiling point in 100 or more molecular weight which has an ester bond or amide association in intramolecular especially, and ordinary pressure is [200 degrees C or more and the melting point] compounds 100 degrees C or less. For example, oleic amide, octadecanamide, dioctyl phthalate, trioctyl trimellitate, etc. are desirable.

[0033] They are the ester compound with which the boiling point in 350 or more molecular weight and ordinary pressure consists above 250 degrees C, and the melting point consists of a with a carbon numbers of six or more carboxylic acid and with a carbon numbers of five or more alcohol below 50 degrees C and the ester compound which the boiling point in 350 or more molecular weight and ordinary pressure is 250 degrees C or more, and the melting point is 30 degrees C or less, and consists of aromatic carboxylic acid and with a carbon numbers of six or more alcohol still more preferably, for example, DOP, trioctyl trimellitate, DIDP, etc. more preferably.

[0034] If the melting point is higher than 100 degrees C, there will be little effectiveness of the improvement in tearing strength by denaturation by the radical generating agent, and shaping and ductility will fall [the boiling point] by the fume at the time of a fabricating operation, and foaming at less than 200 degrees C. Moreover, if molecular weight is small, the bleeding of a film to a plasticizer is not early desirable.

[0035] next, as a radical generating agent of the component (D) used for this invention if needed The thing of the range whose decomposition temperature used as half-life 1 minute is 130-300 degrees C is desirable. For example, dicumyl peroxide, 2, the 5-dimethyl -2, 5-JI (t-butylperoxy) hexane, Peroxides, such as 2, 5-dimethyl -2, 5-screw (t-butylperoxy)-3-hexyne, alpha, and alpha'-screw (t-butylperoxy isopropyl) benzene, dibenzoyl peroxide, and G t-butyl peroxide, are mentioned.

[0036] this invention -- setting -- polyolefin resin -- (-- A --) -- 100 -- weight -- the section -- receiving -- a bulking agent -- (-- B --) -- 100 - 400 -- weight -- the section -- a hydrocarbon -- a compound -- (-- C --) -- one - 100 -- weight -- the section -- and -- the need -- responding -- the range of the radical generating agent (D) 0.0001 - the 0.1 weight sections -- using . If the rate of a bulking agent (B) does not fulfill the 100 weight sections, pore will not be enough formed in

the extended film, but a porosity-ized degree will become low. Moreover, if the rate of a bulking agent exceeds the 400 weight sections, kneading nature, dispersibility, a film, or a sheet moldability will be inferior, and the surface reinforcement of a drawing object will fall further. [0037] In this invention, especially the desirable blending ratio of coal is a bulking agent (B) 120 - the 300 weight sections to the polyolefin resin (A) 100 weight section. When there are few hydrocarbon compounds (C) than 1 weight section, they do not have the effectiveness of the improvement in tearing strength, and if [than the 100 weight sections] more, kneading nature and dispersibility get worse and they cannot secure lowering of a film moldability, and ductility. They are below 50 weight sections more than 5 weight sections preferably.

[0038] Since are chosen out of the range of the 0.0001 - 0.1 weight section, the improvement in the tearing strength by the synergistic effect with a hydrocarbon compound is not obtained when fewer than this range, and a melt index becomes low too much when [than this range] more, a film piece tends to happen at the time of film shaping and surface deterioration occurs on a film front face, a radical generating agent (D) is not desirable.

[0039] T-die shaping after mixing by the aforementioned quantitative ratio by the approach of the following I or II, usually kneading polyolefin resin (A), a bulking agent (B), a plasticizer (C), and a radical generating agent (D) subsequently and pelletizing them in this invention -- inflation molding is carried out and it considers as an unstretched film.

approach I: -- after mixing polyolefin resin, a bulking agent, a plasticizer, and a radical generating agent and kneading using kneading machines, such as an extruder and a Banbury mixer, -- pelletizing -- this pellet -- using -- T-die shaping -- inflation molding is carried out. approach II: -- a lot of radical generating agents to polyolefin resin -- after it blends 0.5 - 1% (about 5000-10000 ppm), and it prepares beforehand the masterbatch which moreover carried out melting kneading in the temperature more than the melting point of polyolefine and which were polyolefine and the temperature which hardly reacts, and was made into the pellet type, and a radical generating agent is mixed with polyolefin resin, a bulking agent, and a plasticizer and kneads this masterbatch -- pelletizing -- this pellet -- using -- T-die shaping -- inflation molding is carried out.

[0040] If kneading-under heating (at temperature beyond temperature from which half-life of radical generating agent becomes 10 minutes preferably) processing of the polyolefin resin is carried out with a radical generating agent according to the approach shown in Above I or II, the denaturation polymer to which the crosslinking reaction by the radical generating agent occurred, polyolefine carried out intermolecular coupling, and the amount component of giant molecules increased, and the melt index fell will be obtained. When drawing processing of this is carried out, tensile strength and impact strength of the film obtained by this denaturation polymer's tending to require lateral orientation when inflation molding is used compared with the polymer before denaturation, and doing in this way improve remarkably.

[0041] Although a drum, a tumbler mold mixer, a ribbon blender, a Henschel mixer, a super mixer, etc. are used in order to mix polyolefin resin, a plasticizer, a radical generating agent, and a bulking agent, the mixer of a high-speed churning mold like a Henschel mixer is desirable, and, as for especially polyethylene, it is usually desirable to supply with the gestalt of the powder of 20-60 meshes 10-150 meshes. Kneading of the obtained mixture is carried out using well-known kneading equipments, such as a screw extruder, a twin screw extruder, a roll mill, a Banbury mixer, and a 2 shaft type kneading machine.

[0042] In this invention, an unstretched film is fabricated by the T-die method or the tubular film process from the mixture obtained above, and, subsequently drawing processing of this

unstretched film is carried out. In the case of inflation molding, a blow up ratio (BUR) is fabricated by 2-8. Preferably, the height of blows up ratio 3-6 and a frost line is increased 2 to 50 times of the diameter of the annular slit of a die. The height of a frost line is performed still more preferably under the conditions of the range of being 5 to 20 times many as the diameter of the annular slit of a die. Since the tensile strength and impact strength of a film will fall if a blow up ratio is lower than the above-mentioned range, and the shaping stability of a bubble will fall if higher than the above-mentioned range, it is not desirable. Moreover, since the tensile strength of a film will fall if the height of a frost line is lower than the above-mentioned range, and the shaping stability of a bubble will fall if higher than the above-mentioned range, it is not desirable.

[0043] Subsequently to a lengthwise direction (the direction of taking over of a film), uniaxial stretching of the unstretched film fabricated by the T-die method or the tubular film process is carried out preferably at least 1 shaft orientations. Although the roll extending method is usually adopted as uniaxial stretching, you may be the form where 1 shaft orientations (the direction of taking over) were made to emphasize by the tubular extending method. Moreover, as for drawing processing, multistage [one step or two steps or more of] does not interfere.

[0044] As for drawing processing, it is desirable to carry out in the range of temperature lower 50 degrees C than the melting point from temperature lower 90 degrees C than the range of temperature lower 20 degrees C than temperature lower 100 degrees C than the melting point of a resin constituent to the melting point, especially the melting point of a resin constituent, and it has the inclination for drawing spots to occur on a film and for the porosity of a film to fall at temperature higher than this range, at temperature lower than this range.

[0045] Draw magnification needs to be 1.2 to 8 times, and under this range is [porosity-izing and tensile strength of an oriented film] insufficient. Moreover, if draw magnification exceeds 8 times, a film becomes what has too much molecular orientation to a lengthwise direction, and the field reinforcement of a film falls and is not desirable [a film]. In addition, if it heat-treats after uniaxial stretching, the dimensional accuracy of a film can be stabilized and surface treatment, such as well-known corona treatment and frame processing, can also be performed.

[0046] A nonwoven fabric may be stuck on the porosity film which is rich in the flexibility acquired by the above-mentioned approach. For a nonwoven fabric, it consists of nylon, polyester (for example, polyethylene terephthalate, polybutylene terephthalate, etc.), or polyethylene (for example, nylon 6, Nylon 66, Nylon 12, etc.), and eyes are 15-30g/m². A thing is used suitably. It is also possible to use the nonwoven fabric which vapor-deposited aluminum etc. to the nonwoven fabric and gave light reflex ability to it.

[0047] The thing using the fiber of the structure covered with polyethylene as a polyethylene system nonwoven fabric, using polyester resin as a core material is good. Such a porosity film and a nonwoven fabric are stuck by the following bonded structures. That is, for example, the approach of applying urethane system 2 liquid type adhesives to punctiform at 10% - 30% (adhesion area) of spreading area, and pasting up is mentioned. The point part of adhesives is 3,180,000 pieces [2-10 million]/m/m². It is good for the path of the point to set to about 0.1-0.5mm with extent. What is necessary is just to perform punctiform spreading of such adhesives with the replica method which used for example, the gravure roll.

[0048] In the case of a polyethylene system nonwoven fabric, it is good to carry out heat adhesion with a porosity film. Even if supposing that it is comparable as the above welds adhesion area all over a nonwoven fabric using a nonwoven fabric with many good openings, the rate for jointing of a porosity film should just be in the above-mentioned range. Since puncturing

of a porosity film will be crushed if heat adhesion area is too large, caution is required. according to the layered product of a configuration of having mentioned above, jointing which sticks a porosity film and a nonwoven fabric is very detailed -- moreover, the front face of a porosity film becomes very smooth by making thickness of a porosity film etc. into a factor, as a result, printing to the front face concerned can also be made very clear, and, moreover, a hand improves remarkably as a whole, and permeability is not spoiled

[0049] The nonwoven fabric of a layered product mentioned above is good at nonwoven fabrics by various processes, such as a span bond nonwoven fabric and a needle punch nonwoven fabric. Moreover, an atomizing process etc. can be used although imprint nature with a gravure roll was illustrated as a method of applying adhesives about both adhesion. However, as for the adhesives used in this case, it is desirable to use for example, EVA system adhesives, elastomeric adhesive, or acrylic adhesives.

[0050] Upgrading of the garden stuff which is the object of this invention is reached by covering in the surface-of-the-earth section on the fundamental circumference of fruits vegetation, and the top face of a root of this vegetation, covering over harvest the film for fruits vegetation which consists of this porosity film and layered product from one - two months before harvest. The coat approach is simply performed by locating the trunk of a fruit tree in opening a school 2 through the incision section 3, as mentioned above. What is necessary is to connect the porosity film and layered product which were prepared for others, or just to cover in between, when the magnitude of this film 1 for fruits vegetation is insufficient. Although the upgrading effectiveness changes also with classes of garden stuff, it is specifically sugar content lifting, fruit cracking prevention, improvement in color luster, etc. Especially a limit does not have the approach of covering and the tension of a root has the desirable approach of covering to homogeneity like that waterdrop does not go into the earth surface which is from between sheets. Although especially a limit does not have the class of garden stuff to which this invention approach is applied, citrus, such as a mandarin orange and Citrus hassaku, an apple, a pear, a peach, a grape, a melon, a watermelon, etc. are mentioned, for example.

[0051]

[Example] Hereafter, although an example explains this invention concretely, this invention is not restrained by the following examples unless the summary is exceeded.

an example 1 and the examples 1 and 2 of a comparison (1) -- a line -- low-density-polyethylene {(melt index MI):1.0g/-- for 10 minutes Rate of flow : 19, consistency:0.921 g/cm³, a copolymerization component:1-butene, The amount of copolymerization : 10 % of the weight, Melting point : Churning mixing of the 20 weight sections is carried out for what similarly ground 80 weight sections and ethylene propylene rubber (EPR, EP07 by Japan Synthetic Rubber Co., Ltd. P) for what ground 120 degree-C} to the powder of 40 meshes to the powder of 40 meshes in a Henschel mixer. Subsequently, addition mixing is carried out, carrying out 0.03 weight section churning of the dioctyl phthalate 4 weight section, the radical generating agent 2, the 5-dimethyl -2, and the 5-screw (t-butylperoxy)-3-hexyne as a plasticizer at this.

[0052] Furthermore, 200 weight sections addition of the calcium carbonate (mean particle diameter of 1.2 micrometers, fatty-acid processing) was carried out, and churning mixing was carried out. the mixture obtained in this way -- 2 -- it kneaded and corned using axial kneading-machine DSM-65 (Double Screw Mixer, Japan Steel Works, Ltd. make). Inflation molding of this was carried out with 40mmphi extruder, and the film was produced on the film with a thickness of 70 micrometers. Extrusion conditions are as follows.

[0053]

[A table 1]

cylinder-temperature: -- a 170-190-210-230 degree-C head and dice temperature:200 degree-C dice diameter:100mm taking over rate:8 m/min blow-up-ratio:3 frost-line height:700mm lay-flat-width: -- the roll drawing machine performed uniaxial stretching for what carried out the slit of the film obtained in this way 471mm in the direction of taking over.

[0054] Drawing conditions were carried out as follows.

[A table 2]

drawing temperature: -- 60-degree-C drawing rate: -- film thickness [after a 11.0 m/min drawing]: -- 30 micrometers [0055] Physical-properties assessment of the obtained film is as follows.

[A table 3]

Air permeability 1800 second / 100ml moisture vapor transmission 3800 g/m² / water pressure-proof [24Hr] > 2000mm H₂O tearing strength 60 g/1-sheet moldability O flexibility O ductility O [0056] The following performed physical-properties assessment.

1) Moisture vapor transmission : ASTM It ** to E26-66(E).

2) Tearing strength : JIS P According to 8116, the direction of taking over of a film is measured and it asks for the reinforcement per sheet by g.

3) Moldability : it judged by the following criteria by viewing.

O : bubble stability, die-line-less O : ** , die-line ** **:film-width fluctuation x: Shaping failure [0057]

4) Flexibility : at the feel of a hand, it judged by the following criteria.

O : -- very soft O: -- soft **: -- somewhat hard x: -- hard [0058] 5) ductility O:cutting nothing, a homogeneity drawing, drawing-nonuniformity-less O:cutting nothing, and drawing nonuniformity -- almost -- nothing **:cutting nothing and drawing nonuniformity -- a little -- it is -- x:cutting or drawing nonuniformity size [0059] It was processed into the film for fruits vegetation in which puncturing of 30cm of diameters and a color with a height of 30cm were formed in the center section of the circular film with an outer diameter [as shows the porosity film made from the above-mentioned polyethylene to drawing 1] of 5m, and covered to the origin of the Wenzhou early crop mandarin orange (the Okitsu early crop, **** ten-year student). The perimeter and the incision section of the film for fruits vegetation were fixed to the ground surface with the rivet, and the color was fixed to the trunk with a string.

[0060] A coat is November 21, 92 and harvest. The sugar content of acidity at the time of a coat was [the saccharic acid ratios 10.0-10.1 93.4 - 93.5% of fruit juice, 57.5-58.0mm (width) of ****, 44.5-44.7mm (length) of **** and a surface appearance] good 1.24% 12.4% on 'January 7, 93. The quality at the time of harvest (a sugar content, acidity, fruit juice, ****, surface appearance) is as being shown in a table 1.

[0061] In addition, the quality in the vegetation (example 2 of a comparison) which does not give the film for fruits vegetation as an example of a comparison was also shown in a table 1. As shown in a table 1, according to this invention approach, a sugar content 13.3, acidity 0.94, the saccharic acid ratio 14.1, 93% of fruit juice, a surface appearance, and color gloss are also good, and the fruits of first-class elegance were obtained.

[0062] On the other hand, as for the control plot (area which did not give the film for fruits vegetation), 78.5% and fruit juice decreased in number, and fruit juice lacked in *****.

[0063]

[A table 4]

[0064] Eyes are 25g/m² to the porosity film obtained in the example 2 example 1. Heat weld of the polyethylene span bond nonwoven fabric was carried out, and it considered as the layered product. 1500 seconds / 100ml, and the moisture vapor transmission of the permeability of the obtained layered product were 3500 g/m²/24Hr(s). When the origin of the Wenzhou early crop mandarin orange as well as an example 1 was covered using this layered product, the almost same result as an example 1 was obtained.

[0065] A radical generating agent was not added in example 3 example 1, and also the porosity film was obtained like the example 1. The porous film was obtained although the moldability at the time of extrusion was instability a little.

[0066] Physical-properties assessment of a film is as follows.

[A table 5]

Air permeability 2000 second / 100ml moisture vapor transmission 4000 g/m² / 24hr water resisting property >1800mmH₂O tearing strength 40 g/1-sheet moldability O flexibility When the origin of the Wenzhou early crop mandarin orange as well as an example 1 was covered using the film O ductility ** Obtained, the almost same result as an example 1 was obtained.

[0067] Eyes are 20 g/m³ to the porosity film obtained in the example 4 example 3. The laminating of the nylon span bond nonwoven fabric was carried out using adhesives (it applies to a nonwoven fabric side). 1800 seconds / 100ml, and the moisture vapor transmission of the permeability of the obtained layered product were 3800 g/m²/24hr(s). When the origin of the Wenzhou early crop mandarin orange as well as an example 1 was covered using this layered product, the almost same result as an example 1 was obtained.

[0068]

[Effect of the Invention] An activity that the film for fruits vegetation of this invention is easy to construct and efficient can be done, and the fruits whose quality which is seen by acidity lowering and sugar content lifting by the easy activity improved are obtained. Moreover, since film reinforcement is strong, while it becomes possible to consider as a thin film and workability improves, the manufacturing cost of a film can also be made cheap.

[0069]

TECHNICAL FIELD

[Industrial Application] This invention relates to the film for fruit growing which can obtain the fruits whose quality, such as a sugar content, improved about the film for fruit growing used for growing arbor nature or herbaceous fruits vegetation, such as a mandarin orange, an apple, a grape, and a watermelon, using a porous-waterproofing film (a film with the thicker film in this description, i.e., a sheet, is included).

PRIOR ART

[Description of the Prior Art] If garden stuff is applied from one - two months before harvest at the time of harvest and water is originally supplied by the rainfall etc., the increment in moisture and the increment in respiration rate in fruits are caused, and it is known that quality, such as a sugar content and acidity reduction, will deteriorate. For this reason, generally, the moisture to a bonnet and soil is intercepted for earth surface by litter before harvest for the purpose of upgrading. However, since litter has few coefficients of water absorption, big effectiveness is not acquired.

[0003] Moreover, although how to cover earth surface with plastic sheeting is also learned, when it sets covered with plastic sheeting, in order that there may be no permeability, the root is filled with the carbon dioxide gas which occurs by breathing, a root will be in an asphyxiation condition and there is **** which causes the opposite effect. Therefore, although the activity it denudes except for a sheet and earth surface is covered with a sheet only in case of [whose] rainy weather is required at the time of fine weather, this has a complicated activity and has not spread easily.

[0004] Moreover, although the nonwoven fabric which reinforced nonwoven fabrics of overly the product made from a super-thin synthetic fiber, such as polypropylene, with the continuous glass fiber nonwoven fabric as materials which have waterproofness and permeability was also considered recently, when this is used as a sheet, it cannot avoid that water permeates and is full from between fiber. Moreover, there is a fault from which it is necessary to thicken a sheet in order for water to permeate and to lessen ****, a material cost becomes high, it is heavy and handling moreover becomes disadvantage, and it has come to spread widely.

[0005] Furthermore, it has permeability, the film excellent in the water proof engine performance was also developed, and covering earth surface using this was also considered. However, what rolled round the long object is rewound in the case of construction, and these films use it, and require time and effort for construction, and it was hard to say that it is efficient.

EFFECT OF THE INVENTION

[Effect of the Invention] An activity that the film for fruits vegetation of this invention is easy to construct and efficient can be done, and the fruits whose quality which is seen by acidity lowering and sugar content lifting by the easy activity improved are obtained. Moreover, since

film reinforcement is strong, while it becomes possible to consider as a thin film and workability improves, the manufacturing cost of a film can also be made cheap.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention aims at offering the film for fruit growing or sheet which time and effort does not require for construction by processing a permeability sheet into a specific configuration.

MEANS

[Means for Solving the Problem] The summary of this invention consists of porous-waterproofing films, and consists in the film for fruit growing characterized by preparing the incision section which is the sheet-like object with which puncturing was formed in the center section, and is attained from the rim section of this sheet-like object to puncturing of a center section.

[0008] Hereafter, the film for fruit growing of this invention is further explained using a drawing. Drawing 1 is the perspective view of an example of the film for fruit growing of this invention. the inside of drawing, and 1 -- in the incision section and 4, a color and 5 show the rim section and, as for the film for fruit growing, and 2, 6 shows [puncturing and 3] joint material, respectively.

[0009] The film 1 for fruit growing consists of porous-waterproofing films made by approach which is mentioned later. Although a porous-waterproofing film is a film which has permeability to gases, such as air and a steam, and has nontransparent nature to waterdrop (liquid), and it will be chosen out of the large range if it has the above-mentioned engine performance, the film of the engine performance more than air permeability 2000 - 5000 seconds /, 100ml, or water pressure-proof 1500mmH₂O is preferably good.

[0010] Here, the approach of specifying air permeability to JIS-P -8117, the method of specifying moisture vapor transmission to JIS-Z-0208, and water pressure-proof are values measured by JIS-L-1092A law. If air permeability is too small, gas permeability will become the cause which causes gas injury bad and hurts its root. Moreover, since it rises while soil cannot maintain at moderate dryness by permeating and crowding waterdrop if water pressure-proof is small but the upgrading effectiveness becomes indefinite, it is necessary to thicken a film, and a film is heavy, and since it becomes thick, handling nature worsens and it becomes unsuitable.

[0011] Although there is especially no limit also about film thickness, 15mmmicro-50mmmicro is desirable practically. Although especially film construction material is not specified, either, films made of polyolefine system resin, such as polyethylene and polypropylene, are usually used suitably.

[0012] The incision section 3 which has the structure where puncturing 2 was formed in the center section of the sheet-like object with which it consists of a porous-waterproofing film of magnitude with the proper structure of the film 1 for fruit growing of this invention and configurations (a round head, rectangular head, etc.), and attains it from the rim section 5 of this sheet-like object to the puncturing 2 of a center section is formed.

[0013] Although this sheet is covered and used for the earth surface of the origin of a fruit tree in an activity, the incision section 3 is for letting the trunk of a fruit tree pass to the puncturing 2 of the film 1 for fruit growing. After letting the trunk of a fruit tree pass to the puncturing 2 of the film 1 for fruit growing, since the need of being open is lost, the incision section 3 is good [the need] for a ground surface to stop with a rivet or to join by the joint material 6, such as a fastener and adhesive tape.

[0014] It is desirable that the tubed color 4 which starts from the edge of puncturing 2 is formed in the puncturing 2 of the center section of the sheet-like object. As for a color 4, it is desirable to be prepared in order to cover the origin of the trunk of a fruit tree thoroughly, and also in order to correspond to the difference in the size of the origin of a fruit tree, it is useful. Although a color 4 is tied up and fixed to the trunk of a fruit tree with a string etc., joint implements, such as a string, adhesive tape, and a fastener, may be beforehand attached in a color 4.

[0015] Next, an example of the manufacture approach of a porous-waterproofing film is explained. Polyolefin resin (A) consists of a copolymer of the homopolymer of ethylene or a propylene, ethylene or a propylene, and other comonomers (compound which has one or more with a carbon numbers of four or more double bonds in intramolecular), and is 3 the consistency (rho) of 0.930g/cm. The following, (melt index MI) 2g / polyolefine system thermoplastics for 10 or less minutes is desirable.

[0016] for example, low density polyethylene and a line -- low density polyethylene and an ethylene-vinylacetate copolymer -- With a consistency of 0.910 or less super-low density polyethylene, polypropylene, ethylene propylene rubber, Although any are sufficient as ethylene-propylene-diene copolymer and ethylene-methacrylic acid ester or such mixture desirable -- consistency 0.91-0.95 g/cm³ a line -- the low-density-polyethylene 50-100 weight section and consistency 0.91 g/cm³ rho 0.930 g/cm³ which consists of the ethylene-alpha olefin copolymer 50-0 weight section of the following Hereafter It is two or less MI polyolefine system thermoplastics.

[0017] a line -- low density polyethylene is the copolymerization object of ethylene and other alpha olefins, for example, is manufactured by copolymerizing ethylene, and the about 4 - 17 % of the weight and other desirable alpha olefins, such as about 5 - 15% of the weight of 1-butene, 1-hexene, 1-octene, 1-decene, and 4-methyl-1-pentene, using the Ziegler type catalyst or the Philips mold catalyst used for inside low voltage method high-density-polyethylene manufacture.

[0018] As the above-mentioned ethylene-alpha olefin copolymer, it is the copolymer of ethylene and a with a carbon numbers of three or more alpha olefin, and the consistency is usually 3 0.91g/cm. The thing of the following is desirable and it is 0.85 - 0.90 g/cm³ more preferably. It is a thing. As a with a carbon numbers of three or more which carry out copolymerization to ethylene alpha olefin, a propylene, 1-butene, 1-pentene, 1-hexene, 4-methyl-1-pentene, etc. are mentioned, and nonconjugated diene, such as 1, 4-hexadiene, a dicyclopentadiene, and ethylidene norbornene, can also be used with these.

[0019] As for the above-mentioned ethylene-alpha olefin copolymer, it is desirable to be able to manufacture by carrying out copolymerization of ethylene and the alpha olefin using a Ziegler type catalyst and the catalyst which consists of a vanadium compound and organoaluminium compounds, such as vanadium trichloride oxide and a vanadium tetrachloride, especially, for the ethylene content in a copolymer to be 40-90-mol the range in which it is %, and for the content of an alpha olefin to be 10-60-mol the range in which it is %.

[0020] As a commercial item of the above-mentioned ethylene-alpha olefin copolymer, for example CdF Chimie E. NORSOFLEX of P. company FREX resin of; Nippon Unicar

(DFDA1137, DFDA1138, DEF1210, DEF19042); TAFUMA of a Mitsui petrochemical company (FW1600, FW1900, MW1920, SMW2440, LW2220, LW2500, LW2550) JSR-EP (EP02P, EP07P, EP57P) of (A4085, A4090, P0180, P0480), and Japan Synthetic Rubber Co., Ltd. etc. is mentioned.

[0021] Independent or the consistency (rho) of polyolefin resin (A) which is mixture is 0.930 g/cm3. If large, the synergistic effect of a plasticizer and a radical generating agent will be small, and tearing strength will not improve. Moreover, if MI is larger than 2g / 10 minutes, the tearing strength of a film will fall and shaping stability will fall.

[0022] In this invention approach, a melt index (MI) is the value measured based on the conditions 4 of the table 1 of JIS-K -7210 which is the reference standard of JIS-K -6760. In addition, according to a conventional method, even if it adds a thermostabilizer, UV stabilizer, a pigment, an antistatic agent, a fluorescence agent, etc., it does not interfere with polyolefin resin.

[0023] Next, an inorganic and organic bulking agent is used as a bulking agent of a component (B). As an inorganic bulking agent, a calcium carbonate, talc, clay, a kaolin, a silica, diatomaceous earth, a magnesium carbonate, a barium carbonate, magnesium sulfate, a barium sulfate, a calcium sulfate, an aluminum hydroxide, a zinc oxide, a magnesium hydroxide, a calcium oxide, magnesium oxide, titanium oxide, an alumina, a mica, asbestos powder, glass powder, milt balun, a zeolite, a clay silicate, etc. are used, and a calcium carbonate, talc, clay, a silica, diatomaceous earth, a barium sulfate, etc. are especially suitable.

[0024] As an organic bulking agent, cellulose type powder, such as wood flour and pulp powder, etc. is used. These are independent, or are mixed and used. As mean particle diameter of a bulking agent, a thing 30 micrometers or less is desirable, a thing 10 micrometers or less is still more desirable, and what is 0.8-5 micrometers is the most desirable. When the compactness of the pore of a drawing object will worsen if particle size is too large, and particle size is too small, the dispersibility to resin is bad and a moldability is also inferior in it.

[0025] The surface treatment of a bulking agent is the dispersibility to resin, and a further ductile point, it is desirable to carry out, and a result with desirable processing with a fatty acid or its metal salt is given. As a hydrocarbon compound of a component (C), 200 degrees C or more are used for the boiling point in ordinary pressure, and a thing 100 degrees C or less is used for the melting point. For example, it is good liquefied or to use a wax-like hydrocarbon polymer and the esterification object of dipentaerythritol.

[0026] As a hydrocarbon polymer of the shape of liquefied or a wax, liquid polybutadiene, liquefied polybutene, liquefied polyisoprenes, and those derivatives are mentioned. Especially, a carboxyl group or hydroxyl-group end liquid polybutadiene is used, and liquefied objects, such as isocyanate denaturation, maleic-anhydride denaturation, and epoxy group denaturation, are also used for the derivative of hydroxyl-group end liquid polybutadiene, for example, an end.

[0027] Furthermore, the polyhydroxy saturated hydrocarbon which hydrogenated the liquefied polybutadiene water garnish which hydrogenated liquid polybutadiene, and hydroxyl-group end liquid polybutadiene is used. This polyhydroxy saturated hydrocarbon is the mostly saturated hydrocarbon polymer, or the principal chain which has 1.5 hydroxyl groups was saturated, even if few per molecule. As for such number average molecular weight, to 400-20,000, and a pan, 500-10,000 are desirable.

[0028] Moreover, the water garnish of carboxyl group end liquid polybutadiene may be used. An epoxy group content organic compound is also used, for example, epoxy system plasticizers, such as epoxidized vegetable oil, such as epoxidation linseed oil and epoxidized soybean oil, an epoxy resin, and a liquefied epoxy resin that does not contain a curing agent preferably, are

mentioned. furthermore, the hydrocarbon polymer or epoxy group content organic compound of the shape of liquefied or a wax -- the 1 - 100 weight section -- it is 1 - 70 weight section preferably. It is more desirable to consider an epoxy group content organic compound as concomitant use with a hydrocarbon system polymer rather than it uses this independently. [0029] If the 100 weight sections are exceeded to the polyolefin resin 100 weight section in case wax-like a hydrocarbon polymer or an epoxy group content organic compound is blended, liquefied or the property which polyolefin resin has fades, and satisfactory kneading nature, the moldability of a film, and ductility cannot be secured. As the third component, ** or a partial esterification object of dipentaerythritol etc. is suitably used for others. As for the esterification object of dipentaerythritol, it is desirable that they are dipentaerythritol and partial ester of a carboxylic acid. As a typical carboxylic acid, the aromatic series monochrome or dicarboxylic acid of the aliphatic series monochrome of carbon numbers 1-30 or dicarboxylic acid, and carbon numbers 7-16 is mentioned. Aliphatic series monocarboxylic acid is desirable especially from a moldability and a ductile point.

[0030] As these examples, aromatic carboxylic acid, such as aliphatic carboxylic acid, such as an acetic acid, a propionic acid, butanoic acid, an isobutyric acid, a valeric acid, an isovaleric acid, a caproic acid, isocaproic acid, 2-ethyl butanoic acid, enanthic acid, a caprylic acid, 2-ethyl hexanoic acid, nonoic acid, a capric acid, a lauric acid, a tridecane acid, a myristic acid, a pentadecane acid, a palmitic acid, stearin acid, eicosanoic acid, a PEHEN acid, a cerotic acid a melissic acid, a succinic acid, a glutaric acid an adipic acid, an azelaic acid, and a sebamic acid, a benzoic acid, a phthalic acid, isophthalic acid, a terephthalic acid, be mentioned independent in the above-mentioned monocarboxylic acid in the case of the single molecule partial ester of dipentaerythritol -- or it can be mixed and used. Moreover, when using dicarboxylic acid, to one mol of dipentaerythritol, 0.5 mols or less are desirable and make the remaining hydroxyl group partial ester using the monocarboxylic acid of the corresponding number of mols.

[0031] Moreover, as a rate of the number of residual OH radicals per partial ester 1 molecule of this dipentaerythritol, for 3 to 70% is good, and especially for 3 - 50% is desirable. If less than 3% of the amelioration effectiveness of ductility and printing nature is insufficient and 70% is exceeded, the film production nature of a film will fall. The blending ratio of coal of the esterification object of dipentaerythritol has desirable 1 - 30 weight section to the polyolefine system resin 100 weight section, and its 3 - 20 weight section is still more desirable.

[0032] The kneading nature which should be satisfied if there are too many loadings is not obtained, and the moldability of a film and ductility cannot be secured. The boiling point in 100 or more molecular weight which has an ester bond or amide association in intramolecular especially, and ordinary pressure is [200 degrees C or more and the melting point] compounds 100 degrees C or less. For example, oleic amide, octadecanamide, dioctyl phthalate, trioctyl trimellitate, etc. are desirable.

[0033] They are the ester compound with which the boiling point in 350 or more molecular weight and ordinary pressure consists above 250 degrees C, and the melting point consists of a with a carbon numbers of six or more carboxylic acid and with a carbon numbers of five or more alcohol below 50 degrees C and the ester compound which the boiling point in 350 or more molecular weight and ordinary pressure is 250 degrees C or more, and the melting point is 30 degrees C or less, and consists of aromatic carboxylic acid and with a carbon numbers of six or more alcohol still more preferably, for example, DOP, trioctyl trimellitate, DIDP, etc. more preferably.

[0034] If the melting point is higher than 100 degrees C, there will be little effectiveness of the
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improvement in tearing strength by denaturation by the radical generating agent, and shaping and ductility will fall [the boiling point] by the fume at the time of a fabricating operation, and foaming at less than 200 degrees C. Moreover, if molecular weight is small, the bleeding of a film to a plasticizer is not early desirable.

[0035] next, as a radical generating agent of the component (D) used for this invention if needed The thing of the range whose decomposition temperature used as half-life 1 minute is 130-300 degrees C is desirable. For example, dicumyl peroxide, 2, the 5-dimethyl -2, 5-JI (t-butylperoxy) hexane, Peroxides, such as 2, 5-dimethyl -2, 5-screw (t-butylperoxy)-3-hexyne, alpha, and alpha'-screw (t-butylperoxy isopropyl) benzene, dibenzoyl peroxide, and G t-butyl peroxide, are mentioned.

[0036] this invention -- setting -- polyolefin resin -- (-- A --) -- 100 -- weight -- the section -- receiving -- a bulking agent -- (-- B --) -- 100 - 400 -- weight -- the section -- a hydrocarbon -- a compound -- (-- C --) -- one - 100 -- weight -- the section -- and -- the need -- responding -- the range of the radical generating agent (D) 0.0001 - the 0.1 weight sections -- using . If the rate of a bulking agent (B) does not fulfill the 100 weight sections, pore will not be enough formed in the extended film, but a porosity-ized degree will become low. Moreover, if the rate of a bulking agent exceeds the 400 weight sections, kneading nature, dispersibility, a film, or a sheet moldability will be inferior, and the surface reinforcement of a drawing object will fall further.

[0037] In this invention, especially the desirable blending ratio of coal is a bulking agent (B) 120 - the 300 weight sections to the polyolefin resin (A) 100 weight section. When there are few hydrocarbon compounds (C) than 1 weight section, they do not have the effectiveness of the improvement in tearing strength, and if [than the 100 weight sections] more, kneading nature and dispersibility get worse and they cannot secure lowering of a film moldability, and ductility. They are below 50 weight sections more than 5 weight sections preferably.

[0038] Since are chosen out of the range of the 0.0001 - 0.1 weight section, the improvement in the tearing strength by the synergistic effect with a hydrocarbon compound is not obtained when fewer than this range, and a melt index becomes low too much when [than this range] more, a film piece tends to happen at the time of film shaping and surface deterioration occurs on a film front face, a radical generating agent (D) is not desirable.

[0039] T-die shaping after mixing by the aforementioned quantitative ratio by the approach of the following I or II, usually kneading polyolefin resin (A), a bulking agent (B), a plasticizer (C), and a radical generating agent (D) subsequently and pelletizing them in this invention -- inflation molding is carried out and it considers as an unstretched film.

approach I: -- after mixing polyolefin resin, a bulking agent, a plasticizer, and a radical generating agent and kneading using kneading machines, such as an extruder and a Banbury mixer, -- pelletizing -- this pellet -- using -- T-die shaping -- inflation molding is carried out.
approach II: -- a lot of radical generating agents to polyolefin resin -- after it blends 0.5 - 1% (about 5000-10000 ppm), and it prepares beforehand the masterbatch which moreover carried out melting kneading in the temperature more than the melting point of polyolefine and which were polyolefine and the temperature which hardly reacts, and was made into the pellet type, and a radical generating agent is mixed with polyolefin resin, a bulking agent, and a plasticizer and kneads this masterbatch -- pelletizing -- this pellet -- using -- T-die shaping -- inflation molding is carried out.

[0040] If kneading-under heating (at temperature beyond temperature from which half-life of radical generating agent becomes 10 minutes preferably) processing of the polyolefin resin is carried out with a radical generating agent according to the approach shown in Above I or II, the

denaturation polymer to which the crosslinking reaction by the radical generating agent occurred, polyolefine carried out intermolecular coupling, and the amount component of giant molecules increased, and the melt index fell will be obtained. When drawing processing of this is carried out, tensile strength and impact strength of the film obtained by this denaturation polymer's tending to require lateral orientation when inflation molding is used compared with the polymer before denaturation, and doing in this way improve remarkably.

[0041] Although a drum, a tumbler mold mixer, a ribbon blender, a Henschel mixer, a super mixer, etc. are used in order to mix polyolefin resin, a plasticizer, a radical generating agent, and a bulking agent, the mixer of a high-speed churning mold like a Henschel mixer is desirable, and, as for especially polyethylene, it is usually desirable to supply with the gestalt of the powder of 20-60 meshes 10-150 meshes. Kneading of the obtained mixture is carried out using well-known kneading equipments, such as a screw extruder, a twin screw extruder, a roll mill, a Banbury mixer, and a 2 shaft type kneading machine.

[0042] In this invention, an unstretched film is fabricated by the T-die method or the tubular film process from the mixture obtained above, and, subsequently drawing processing of this unstretched film is carried out. In the case of inflation molding, a blow up ratio (BUR) is fabricated by 2-8. Preferably, the height of blows up ratio 3-6 and a frost line is increased 2 to 50 times of the diameter of the annular slit of a die. The height of a frost line is performed still more preferably under the conditions of the range of being 5 to 20 times many as the diameter of the annular slit of a die. Since the tensile strength and impact strength of a film will fall if a blow up ratio is lower than the above-mentioned range, and the shaping stability of a bubble will fall if higher than the above-mentioned range, it is not desirable. Moreover, since the tensile strength of a film will fall if the height of a frost line is lower than the above-mentioned range, and the shaping stability of a bubble will fall if higher than the above-mentioned range, it is not desirable.

[0043] Subsequently to a lengthwise direction (the direction of taking over of a film), uniaxial stretching of the unstretched film fabricated by the T-die method or the tubular film process is carried out preferably at least 1 shaft orientations. Although the roll extending method is usually adopted as uniaxial stretching, you may be the form where 1 shaft orientations (the direction of taking over) were made to emphasize by the tubular extending method. Moreover, as for drawing processing, multistage [one step or two steps or more of] does not interfere.

[0044] As for drawing processing, it is desirable to carry out in the range of temperature lower 50 degrees C than the melting point from temperature lower 90 degrees C than the range of temperature lower 20 degrees C than temperature lower 100 degrees C than the melting point of a resin constituent to the melting point, especially the melting point of a resin constituent, and it has the inclination for drawing spots to occur on a film and for the porosity of a film to fall at temperature higher than this range, at temperature lower than this range.

[0045] Draw magnification needs to be 1.2 to 8 times, and under this range is [porosity-izing and tensile strength of an oriented film] insufficient. Moreover, if draw magnification exceeds 8 times, a film becomes what has too much molecular orientation to a lengthwise direction, and the field reinforcement of a film falls and is not desirable [a film]. In addition, if it heat-treats after uniaxial stretching, the dimensional accuracy of a film can be stabilized and surface treatment, such as well-known corona treatment and frame processing, can also be performed.

[0046] A nonwoven fabric may be stuck on the porosity film which is rich in the flexibility acquired by the above-mentioned approach. For a nonwoven fabric, it consists of nylon, polyester (for example, polyethylene terephthalate, polybutylene terephthalate, etc.), or

polyethylene (for example, nylon 6, Nylon 66, Nylon 12, etc.), and eyes are 15-30g/m². A thing is used suitably. It is also possible to use the nonwoven fabric which vapor-deposited aluminum etc. to the nonwoven fabric and gave light reflex ability to it.

[0047] The thing using the fiber of the structure covered with polyethylene as a polyethylene system nonwoven fabric, using polyester resin as a core material is good. Such a porosity film and a nonwoven fabric are stuck by the following bonded structures. That is, for example, the approach of applying urethane system 2 liquid type adhesives to punctiform at 10% - 30% (adhesion area) of spreading area, and pasting up is mentioned. The point part of adhesives is 3,180,000 pieces [2-10 million]/m/m². It is good for the path of the point to set to about 0.1-0.5mm with extent. What is necessary is just to perform punctiform spreading of such adhesives with the replica method which used for example, the gravure roll.

[0048] In the case of a polyethylene system nonwoven fabric, it is good to carry out heat adhesion with a porosity film. Even if supposing that it is comparable as the above welds adhesion area all over a nonwoven fabric using a nonwoven fabric with many good openings, the rate for jointing of a porosity film should just be in the above-mentioned range. Since puncturing of a porosity film will be crushed if heat adhesion area is too large, caution is required. according to the layered product of a configuration of having mentioned above, jointing which sticks a porosity film and a nonwoven fabric is very detailed -- moreover, the front face of a porosity film becomes very smooth by making thickness of a porosity film etc. into a factor, as a result, printing to the front face concerned can also be made very clear, and, moreover, a hand improves remarkably as a whole, and permeability is not spoiled

[0049] The nonwoven fabric of a layered product mentioned above is good at nonwoven fabrics by various processes, such as a span bond nonwoven fabric and a needle punch nonwoven fabric. Moreover, an atomizing process etc. can be used although imprint nature with a gravure roll was illustrated as a method of applying adhesives about both adhesion. However, as for the adhesives used in this case, it is desirable to use for example, EVA system adhesives, elastomeric adhesive, or acrylic adhesives.

[0050] Upgrading of the garden stuff which is the object of this invention is reached by covering in the surface-of-the-earth section on the fundamental circumference of fruits vegetation, and the top face of a root of this vegetation, covering over harvest the film for fruits vegetation which consists of this porosity film and layered product from one - two months before harvest. The coat approach is simply performed by locating the trunk of a fruit tree in opening a school 2 through the incision section 3, as mentioned above. What is necessary is to connect the porosity film and layered product which were prepared for others, or just to cover in between, when the magnitude of this film 1 for fruits vegetation is insufficient. Although the upgrading effectiveness changes also with classes of garden stuff, it is specifically sugar content lifting, fruit cracking prevention, improvement in color luster, etc. Especially a limit does not have the approach of covering and the tension of a root has the desirable approach of covering to homogeneity like that waterdrop does not go into the earth surface which is from between sheets. Although especially a limit does not have the class of garden stuff to which this invention approach is applied, citrus, such as a mandarin orange and Citrus hassaku, an apple, a pear, a peach, a grape, a melon, a watermelon, etc. are mentioned, for example.

EXAMPLE

[Example] Hereafter, although an example explains this invention concretely, this invention is not restrained by the following examples unless the summary is exceeded.
an example 1 and the examples 1 and 2 of a comparison (1) -- a line -- low-density-polyethylene {(melt index MI):1.0g/-- for 10 minutes Rate of flow : 19, consistency:0.921 g/cm3, a copolymerization component:1-butene, The amount of copolymerization : 10 % of the weight, Melting point : Churning mixing of the 20 weight sections is carried out for what similarly ground 80 weight sections and ethylene propylene rubber (EPR, EP07 by Japan Synthetic Rubber Co., Ltd. P) for what ground 120 degree-C} to the powder of 40 meshes to the powder of 40 meshes in a Henschel mixer. Subsequently, addition mixing is carried out, carrying out 0.03 weight section churning of the dioctyl phthalate 4 weight section, the radical generating agent 2, the 5-dimethyl -2, and the 5-screw (t-butylperoxy)-3-hexyne as a plasticizer at this.

[0052] Furthermore, 200 weight sections addition of the calcium carbonate (mean particle diameter of 1.2 micrometers, fatty-acid processing) was carried out, and churning mixing was carried out. the mixture obtained in this way -- 2 -- it kneaded and corned using axial kneading-machine DSM-65 (Double Screw Mixer, Japan Steel Works, Ltd. make). Inflation molding of this was carried out with 40mmphi extruder, and the film was produced on the film with a thickness of 70 micrometers. Extrusion conditions are as follows.

[0053]

[A table 1]

cylinder-temperature: -- a 170-190-210-230 degree-C head and dice temperature:200 degree-C dice diameter:100mm taking over rate:8 m/min blow-up-ratio:3 frost-line height:700mm lay-flat-width: -- the roll drawing machine performed uniaxial stretching for what carried out the slit of the film obtained in this way 471mm in the direction of taking over.

[0054] Drawing conditions were carried out as follows.

[A table 2]

drawing temperature: -- 60-degree-C drawing rate: -- film thickness [after a 11.0 m/min drawing]: -- 30 micrometers [0055] Physical-properties assessment of the obtained film is as follows.

[A table 3]

Air permeability 1800 second / 100ml moisture vapor transmission 3800 g/m² / water pressure-proof [24Hr] > 2000mm H₂ O tearing strength 60 g/1-sheet moldability O flexibility O ductility O [0056] The following performed physical-properties assessment.

1) Moisture vapor transmission : ASTM It ** to E26-66(E).

2) Tearing strength : JIS P According to 8116, the direction of taking over of a film is measured and it asks for the reinforcement per sheet by g.

3) Moldability : it judged by the following criteria by viewing.

O : bubble stability, die-line-less O : ** , die-line ** ***:film-width fluctuation x: Shaping failure [0057]

4) Flexibility : at the feel of a hand, it judged by the following criteria.

O : -- very soft O: -- soft **: -- somewhat hard x: -- hard [0058] 5) ductility O:cutting nothing, a homogeneity drawing, drawing-nonuniformity-less O:cutting nothing, and drawing nonuniformity -- almost -- nothing **:cutting nothing and drawing nonuniformity -- a little -- it is -- x:cutting or drawing nonuniformity size [0059] It was processed into the film for fruits vegetation in which puncturing of 30cm of diameters and a color with a height of 30cm were formed in the center section of the circular film with an outer diameter [as shows the porosity film made from the above-mentioned polyethylene to drawing 1] of 5m, and covered to the

origin of the Wenzhou early crop mandarin orange (the Okitsu early crop, **** ten-year student). The perimeter and the incision section of the film for fruits vegetation were fixed to the ground surface with the rivet, and the color was fixed to the trunk with a string.

[0060] A coat is November 21, 92 and harvest. The sugar content of acidity at the time of a coat was [the saccharic acid ratios 10.0-10.1 93.4 - 93.5% of fruit juice, 57.5-58.0mm (width) of ****, 44.5-44.7mm (length) of **** and a surface appearance] good 1.24% 12.4% on 'January 7, 93. The quality at the time of harvest (a sugar content, acidity, fruit juice, ****, surface appearance) is as being shown in a table 1.

[0061] In addition, the quality in the vegetation (example 2 of a comparison) which does not give the film for fruits vegetation as an example of a comparison was also shown in a table 1. As shown in a table 1, according to this invention approach, a sugar content 13.3, acidity 0.94, the saccharic acid ratio 14.1, 93% of fruit juice, a surface appearance, and color gloss are also good, and the fruits of first-class elegance were obtained.

[0062] On the other hand, as for the control plot (area which did not give the film for fruits vegetation), 78.5% and fruit juice decreased in number, and fruit juice lacked in *****.

[0063]

[A table 4]

[0064] Eyes are 25g/m² to the porosity film obtained in the example 2 example 1. Heat weld of the polyethylene span bond nonwoven fabric was carried out, and it considered as the layered product. 1500 seconds / 100ml, and the moisture vapor transmission of the permeability of the obtained layered product were 3500 g/m²/24Hr(s). When the origin of the Wenzhou early crop mandarin orange as well as an example 1 was covered using this layered product, the almost same result as an example 1 was obtained.

[0065] A radical generating agent was not added in example 3 example 1, and also the porosity film was obtained like the example 1. The porous film was obtained although the moldability at the time of extrusion was instability a little.

[0066] Physical-properties assessment of a film is as follows.

[A table 5]

Air permeability 2000 second / 100ml moisture vapor transmission 4000 g/m² / 24hr water resisting property >1800mmH₂O tearing strength 40 g/1-sheet moldability O flexibility When the origin of the Wenzhou early crop mandarin orange as well as an example 1 was covered

using the film O ductility ** Obtained, the almost same result as an example 1 was obtained. [0067] Eyes are 20 g/m³ to the porosity film obtained in the example 4 example 3. The laminating of the nylon span bond nonwoven fabric was carried out using adhesives (it applies to a nonwoven fabric side). 1800 seconds / 100ml, and the moisture vapor transmission of the permeability of the obtained layered product were 3800 g/m²/24hr(s). When the origin of the Wenzhou early crop mandarin orange as well as an example 1 was covered using this layered product, the almost same result as an example 1 was obtained.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The perspective view of an example of the film for fruit growing of this invention.

[Description of Notations]

1 Film for Fruit Growing

2 Puncturing

3 Incision Section

4 Color

5 Rim Section

6 Joint Material